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CONTRIBUTIONS TO THE KNOWLEDGE OF THE DISEASES OF THE UVEAL TRACT.

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(*With Plate I, Figs. I, II and III.*)

I.

IRITIS SEROSA, WITH SOME REMARKS ON SYMPATHETIC TRANSMISSION.

THE literature of iritis serosa is extremely scanty. This is easily explained by the lack of anatomical material and the difficulty of obtaining sections in *pure* cases of this disease. While the clinical picture of iritis serosa, hydromeningitis, aquocapsulitis, has been very well and faithfully described in English literature, especially under the latter title, we have to refer exclusively to text-books for the finer anatomical details. Thus to cite one of the latest examples: Von Wecker (*Graefe-Saemisch's Hand-Buch*, Band iv, 490), says that "the inflammatory product exudes in the form of a serous fluid, from which the coagulable elements are precipitated and form a granular and mostly punctated coating on the anterior surface of the anterior chamber." Further on, he continues: "These precipitates at first are formed only of an amorphous, fibrinous-exudation, mingled however very soon with cellular elements originating from the irritated membrane of Descemet." Again; "The serous iritis must be violent and have

lasted a long time, to cause so noticeable a participation on the part of the layer of cells which lines the posterior surface of the cornea."

We find very similar descriptions in other authors. But this paper will, I think, show that we shall reach decidedly different results and views. Schweigger alone has anatomically examined a case of this sort, but not a *pure* one, and thus describes it in his "Treatise," (page 346).

"I found the epithelial surface of Descemet's membrane in an eye enucleated for iridochoroiditis, dotted with numerous grayish-white prominences, which however, rested so loosely upon it, that a drop of water sufficed to wash them partially away. These particles consisted of masses of detritus with a few fat granules, while the spots remaining attached to Descemet's membrane were composed of exuberant cells in a state of decay; similar alterations were also present near these spots and further off in the epithelium of the membrane, and they even extended as far as the cellular elements which rest upon the ligamentum pectinatum."

Schweigger therefore concludes that the deposits on the posterior surface of the cornea might be caused by an alteration of the epithelium of Descemet's membrane.

This is about all that has hitherto been known or accepted as regards the finer processes in iritis serosa. As these quotations however, show that a great deal still seems hypothetical or wholly unknown in so far as concerns this disease, I feel justified in communicating in detail, the following case of iritis serosa, which I observed closely and examined anatomically, and so much the more, as other interesting relations were discovered.

B. H., æt. 19, was treated for a long time, about a year ago for chlorosis, and was admitted to the ophthalmic wards of the Zurich Hospital, January 25, 1878, with the following condition.

Left Eye.—The anterior surface of the cornea is dull and stippled; the posterior surface shows a large number of deposits as large as a pin-head, rising above the pupillary field; close beside these are a large number of punctated precipitates. She counts fingers at 12′. The fundus oculi cannot be recognized

with the ophthalmoscope ; the red reflex alone is seen, and the presence of numerous vitreous opacities determined.

Right Eye.—Em. S. $\frac{10}{10}$; J. 1 up to 3.″ Numerous punctated deposits line the posterior wall of the cornea as far up as the centre of the pupil. The optic papilla appears somewhat reddened, and its contours are ill defined ; the choroidal pigment is thinned at the equatorial zone, while on the nasal side we see an irregular pale-yellow spot, and occasional patches of excessive pigment. The iris reacts promptly to incident light.

The pupils dilated *ad max.* under atropine, and there were no posterior synechiæ.

January 29th.—Paracentesis corneæ, *L. E.;* most of the deposits on Descemet's membrane were loosened by rubbing upon the cornea, and washed from the eye by evacuation of the aqueous humor when it had again accumulated.

The treatment, chiefly strengthening, was directed to the chlorosis and anæmia, and at the end of February, *R. E.* was as before ; *L. E.* showed fresh deposits, although less extensive than on admission, and fingers were counted at 20.′ *T.*, though tested frequently remained normal in *R. E.*, while in *L. E.*, it was always diminished although not remarkably so.

March 7, 1878.—The patient died from an attack of croupous laryngitis, complicated with right-sided pneumonia, with partial gangrene of the lungs.

The autopsy and removal of the eyes took place on the following morning. The bulbs were preserved in Müller's fluid.

The eyes when hardened sufficiently and opened, offered no other abnormity than the deposits on the cornea; except that in both, as a result of the action of the hardening fluid, the anterior half of the vitreous body had become transformed into a transparent jelly, while the posterior half had become fluid and had escaped.

The microscopic examination showed the following condition.

LEFT EYE.

The anterior portion of the sclera is somewhat richer

in cells than normal, especially around the vessels and close to the lamina fusca; this cellular infiltration increases toward the corneo-scleral junction where it culminates. The subconjunctival tissue also is moderately infiltrated with cells, particularly toward the cornea. A few small vessels with infiltrated sheaths can be traced into the various layers of the cornea, especially into the deepest, while none are met with in the most superficial layers.

The conjunctival epithelium is visibly thickened toward the cornea, its cells appear somewhat enlarged, and the outermost layers having undergone cornification are easily stripped off; the same is the case on the cornea itself.

Bowman's membrane is remarkably thickened, so that on sections it appears thicker than Descemet's membrane.

The cornea contains numerous round cells, which are abundant in the lamellæ nearest the anterior chamber, but rare in the anterior lamellæ.

A closer examination of the apparent collections of migratory cells in the form of small patches in the deepest layers of the cornea, always shows the cross-section of a small vessel in the centre or at the edge, and demonstrates that these collections are really the infiltrated sheathes of the vessels mentioned before, which the section has divided.

The cellular infiltration of the cornea also, increases in intensity toward the sclera, so that on meridional and plane sections, the corneo-scleral boundary is very distinctly marked. In meridional sections, this infiltration often assumes the shape of two triangles, the summits of which however do not always unite in the middle; the sub-conjunctival tissue forms the base of the one, while the base of the other lies at Fontana's space, and embraces Schlemm's canal, the orifice of which is very distinctly visible amidst the cellular infiltration. *On Descemet's membrane we find a large amount of the well known deposits which are characteristic of iritis serosa.* These however, vary greatly in size. If we examine the surface of Descemet's membrane, to which the epithelium is still attached, we find the latter perfectly normal and free from lacunæ. Here and there some-

times on the epithelial cells, but chiefly on their cement-lines, we recognize a delicate, granular precipitate, composed partly of pigment granules, and partly of what we are accustomed to call detritus. Only a few round cells are to be seen upon the epithelium; they are generally collected together in small heaps, one of which is represented at Fig. 1, *a;* in most cases, these patches still contain a varying amount of pigment molecules and detritus.

Sections proved more suitable for examining the larger patches. Here also we frequently see only pigment and detritus lying upon the cells of Descemet's membrane, or single cells (Fig. 1, *b*,) clinging closely to the same. When the collections of cells are larger, the boundaries of the individual cells become more and more obliterated, and we finally see more or less abundant deposits, consisting of confluent protoplasm, or detritus, pigment, and the easily recognizable nuclei of cells, the boundaries of which are, on the whole, no longer distinguishable. (Fig. 1, *c*, *d*. *e*.) But while the endothelial layer of Descemet's membrane appears wholly intact beneath the small patches (Fig. 1, *a*, *b*), it seems to yield quite noticeably beneath the larger patches (Fig. 1, *c* and *d*), while under the largest, it disappears completely (Fig. 1, *e*). We sometimes obtain pictures which seem to indicate an increase of cells, or nuclear segmentation of the endothelial cells of Descemet's membrane, but I could not wholly satisfy myself on that point, as even plane views do not give exact pictures. In the neighborhood of the deposits, the nuclei of the endothelial layer were pressed more closely together, smaller, and more intensely colored with hæmatoxylin. But this might be explained by the mechanical pressure exercised by the deposits, which become more abundant and of greater circumference toward the periphery of the cornea, and at the lower equator of the cornea especially, coalesce into larger plaques which extend as far as the ligamentum pectinatum.

As regards the cornea, we have nothing more to describe except the condition of the paracentesis scar (Fig. 2). This had passed rather obliquely through the corneal tissue;

the peripheral end of Descemet's membrane was folded where it had been transfixed and lay somewhat behind the central end which was not folded. Newly formed striated tissue was found between both of these ends, and at some distance away on the central portions of Descemet's membrane, upon which, as well as upon the rest of the cornea, considerable deposits could be demonstrated.

The aqueous humor was not especially examined in this case, but from a sketch in Prof. Horner's collection, of the aqueous humor evacuated by paracentesis in another case of iritis serosa, I see that it contains in suspension the same elements found in the deposits on the cornea; cells in a more or less advanced stage of decay, detritus and pigment molecules. It is hard to decide how much of this is really contained in the aqueous and how much is set free by the operation and so becomes mingled with the aqueous; at all events it is a question of but minor importance.

The meshes of the ligamentum pectinatum are stuffed full of cells, and therefore somewhat distended. The iris is slightly retracted at its insertion, so that Fontana's space lies wide open toward the anterior chamber. The cellular infiltration passes over uninterruptedly into the corneo-scleral junction. Larger and globular deposits of the same elements composing the deposits on the cornea, rest here and there in the angle of the iris, especially in the lower portions of the anterior chamber.

The iris shows a remarkable cellular infiltration, which increases in intensity toward its anterior surface; the anterior surface on sections sometimes resembling a granulating wound. As the cells are heaped more thickly together at certain spots, well-defined patches are formed and the iris becomes thickened. This is chiefly the case at the insertion of the iris, and on the anterior surface of the sphincter iridis. At the last mentioned region especially, we might be justified in speaking of scattered, small granulomata. This thicker accumulation of cells seems to extend completely around the insertion of the iris; at least, I never failed to find it on examination of the sections. The pigment cells on

the posterior surface of the iris appear somewhat enlarged, sometimes as if swollen, but otherwise they are not abnormal.

The muscular portion of the ciliary body as well as the inner portion of its connective tissue show an abundant cellular infiltration which is continuous with the excessive infiltration at the insertion of the iris; the cellular infiltration is more marked in the connective tissue, while in those portions of the ciliary muscle adjoining the sclera, it decreases quite noticeably. *The evident centre of inflammation lies at the attachment of the iris and ciliary muscle, and in the adjoining portions of the ciliary body.*

I could not discover any other alterations in the uveal pigment on those portions of the ciliary body appertaining to the posterior chamber, than had already been seen on the posterior surface of the iris. More remarkable alterations however, were discovered still further back. A large number of round cells were found between the fibres continuous to the zone of Zinn, and a few between the cells of the ciliary portion of the retina. These are pretty evenly distributed, but are occasionally heaped up into pretty large deposits which contain detritus and pigment granules. Cells as well as free pigment are also found in the region of Petit's canal, and sometimes lying on the capsule of the lens. The cells of the pars ciliaris retinæ itself are for the most part greatly swollen, have partially lost their pigment and are occasionally found in an evident state of degeneration. Hence we find a large amount of free pigment, as well in the deposits of round cells above described, as between the fibres of the zone of Zinn, and in Petit's canal. The round cells with but few exceptions have only one nucleus, and are frequently seen in a state of apparent degeneration and dissolution; their more minute nature will be referred to further on. In addition to the usual round cells, we also meet with transparent cells, less numerous, sharply-defined, twice as large as the round cells, and furnished with one or two large oval nuclei, which are however less deeply tinged with hæmatoxylin. These are distinguishable at a first glance from the migratory cells of half the size, with granu-

lar protoplasm, and deeply tinted nuclei. They remind us somewhat of pavement epithelium, and I can only regard them as products of the cells of the pars ciliaris retinæ. Cells that were very similar in outward appearance, were described in other regions in the eye as "epithelia of the hyaloid," although this could not be proved with certainty.

The choroid throughout, showed an excessive cellular infiltration in the layer of larger vessels and the chorio-capillaris, both of which were also very hyperæmic. The round cells to which this infiltration is due, are everywhere easily distinguishable from the tissue cells by their nuclei, which are smaller, round, and less deeply tinted with hæmatoxylin. The infiltration is not of equal intensity throughout, but is spread out in varying amount over the choroid; yet it cannot be said to exist in circumscribed patches. If we look at the superficies this condition is less marked, the infiltration then appears completely diffuse. On the other hand, the supra-choroidea contains surprisingly few round cells, and the nuclei which are visible along the vessels and nerves penetrating the sclera, are scarcely larger than normal.

The pigment epithelium in the fundus oculi appears swollen, but beyond this no coarser alterations can be discovered. Its cells, on the whole, are poor in pigment (the patient was a tawny blonde), and exhibit but few changes except close to the papilla, which, however, we shall probably be obliged to refer to the commencement of a staphyloma posticum; the enlargement of the region of the optic nerve sheaths on the nasal side also favors this view. At this point we also recognize distinct processes of proliferation, since many of the swollen cells overlie one another. The whole choroid seems to have been somewhat swollen during life, for it has shrunk irregularly in places under the action of the hardening fluid. Its general increase in thickness, however, is to be accounted for by the hyperæmia and cellular infiltration previously mentioned.

The only change observable in the retina was œdematous swelling of the outer part of the inner limiting membrane, and inner granular layer.

Those portions of the vitreous body which were closely adherent to the anterior segment of the globe, showed numerous finely granular membranes, interspersed with a few round cells. The cells were more frequent in the most anterior segment only, and between the fibres of the zone of Zinn, and in Petit's canal.

The optic disc was somewhat swollen, and exhibited abundant cellular infiltration, which extended but very slightly into the retina. The only infiltration visible nearest the papilla was in the layer of nerve fibres, where it quickly ceased. On the other hand, the moderate cellular infiltration in the optic nerve could be followed far into the orbit; toward the foramen opticum, however, it decreased by degrees, and on reaching that point it was scarcely visible. Only the peripheral nerve bundles of the optic nerve still contained numerous cells, and coalesced here with a very pronounced infiltration of the pial sheath of the optic nerve. This could be traced all along from the sclera, so far as the nerve extended, and also beyond the foramen opticum into the cranial cavity (the optic nerves were both cut off short at the chiasma). The infiltration, which was not of equal intensity throughout, yet everywhere pronounced, was confined exclusively to the pial sheath; the dural sheath was intact. The cells lay partially in the concentric layers of connective tissue, which as the pial sheath envelope the nerve bundles of the optic nerve, and they clung partially to the connective tissue fibres, which, especially within the sclera, are stretched between the external and internal sheaths of the optic nerve. Small shreds which were pulled off from the pial sheath showed a continuous endothelial deposit, upon which, however, no process of proliferation could be discovered. The internal and external sheaths of the optic nerve were adherent at a circumscribed spot about 1½ *cm.* behind the sclera, near which the cellular infiltration was quite intense. The optic nerve also at this spot was noticeably infiltrated with cells, as could be confirmed by a series of consecutive cross-sections.

Nothing abnormal could be discovered in the lens.

RIGHT EYE.

After so detailed a description of the *left* eye, which was much more affected than the *right*, I shall content myself with pointing out their, chiefly quantitative, differences. These, however, were remarkably slight, especially as regards the changes in the deeper portions of the bulb. Indeed the deposits on the posterior surface of the cornea were much less numerous and thinner than those of the left eye. Large districts of the endothelium of Descemet's membrane, especially on the upper half of the cornea, were quite intact, nor were many deposits discovered when sections were examined. But wherever they were discovered, the same relations were determined as in the left eye. The infiltration of the cornea and sub-conjunctival tissue was less marked, but clearly pronounced; the same may be said of the infiltration of the corneo-scleral junction. On the other hand, the iris and ligamentum pectinatum were thickly interspersed with cells; amongst other instances, a thick heap of cells which appeared circumscribed on sections, was very pronounced on the iris, close to its insertion on the ciliary body. Occasional thickening, due to round cells and pigment, was observed on the sphincter iridis. We should also mention here, that in one preparation treated precisely like the others, only tinted with carmine, the cellular infiltration at the insertion of the iris, was less deeply colored than the other deposits of cells. After my attention had been excited by this fact, I noticed in the hæmatoxylin preparations also, that the deposit of cells showed a distinct yellow tinge in its centre, indicating regressive metamorphosis.

The ciliary body, especially its connective tissue elements, showed as intense an infiltration as in the left eye; on the other hand, the cells were not interspersed so freely in the pars ciliaris retinæ and the fibres of the zonula. Nevertheless in this eye also, small deposits of cells, miliary patches (two of which are represented in Fig. 3), were frequently met with in this region.

The retina was normal, with exception of Iwanoff's

œdema in the most anterior segments; its corrugation, however, was rather more pronounced than in the left eye, and the thickening of the united internal limiting membrane and the hyaloid still more considerable. A moderate infiltration with round cells was also present.

The condition of the vitreous body was similar to that of the left eye, but the cells in the anterior portion were less abundant.

The infiltration with round cells and hyperæmia of the choroid were not so excessive as in the left eye, but still quite considerable, and extending over the whole choroid, although much less noticeable toward the ciliary body. The neuritis was more pronounced than in the left eye, but at the same time the papilla was not noticeably swollen; here too, the infiltration toward the retina ceased very close to the optic disc.

The infiltration of the pial sheath of the optic nerve seemed to me rather more marked, at least as well marked as in the left eye, and the optic nerve itself showed precisely the same state. I was unable to detect any union whatever between the pial and dural sheaths, although I examined many cross-sections along the whole length of the optic nerve. Here again the cellular infiltration of the pial sheath extended as far as the optic nerve was present, and beyond into the cranial cavity without any decrease in intensity. Near the foramen opticum the dural sheath also, showed occasional cellular infiltration.

I should also mention that a small haemorrhage was found on a level with the foramen opticum, in an artery 1 *mm.* in diam., which passed through the foramen in company with the optic nerve.

After these purely anatomical details, let us now turn to the discussion of this case, and to the consequences which the condition of the parts as discovered, may have upon our views on iritis serosa and on other more or less kindred diseases of the eye.

The increased thickening of Bowman's membrane in so young a person, can only show on the whole, a process going on in the anterior part of the globe and connected with increased change of matter.

I regard this membrane essentially as the product of the deepest cells of the corneal epithelium, and analogous to the cement substance of the other epithelial cells, hence, the long-continued increased interchange of nutritive material in the epithelium, manifesting itself as in our case by an increased exfoliation of the uppermost cells, as it were a desquamative catarrh, must cause Bowman's membrane to become thickened. Still for our case, and also for iritis serosa on the whole, this is of minor importance.

The origin of the elements composing the deposits on Descemet's membrane is, however, a question of much more importance. A single glance at our preparations shows that at least the majority of the elements originate in the iris, and at all events exude from its anterior surface into the anterior chamber. We see the whole tissue of the iris interspersed with round cells forming numerous well-defined patches, and containing more or less free pigment, which evidently originates from the stroma cells of the iris as they undergo degeneration during the cellular infiltration.

We see further, especially under low powers, how these cells increase toward the anterior surface of the iris, while occasionally we see the perfect image of a granulating wound. These round cells which are therefore, really "secreted," together with their detritus and some pigment, are seen in the aqueous humor evacuated by the paracentesis and in the deposits on Descemet's membrane.

The condition of the endothelium of Descemet's membrane is of great interest. While authors have previously been accustomed to ascribe to this layer a more or less active rôle in the formation of the patches, I must emphasize its pure passivity in this process. This is plain from the anatomical description of the deposits. The smallest patches lie on the intact endothelium; when the patches are larger, the endothelium is destroyed, to

undergo in all probability a regeneration from the neighboring districts when the cells of the deposits have crumbled to pieces and their detritus has been absorbed. It is true that I cannot at present offer exact proof of this endothelial regeneration; the processes of nuclear segmentation observed in the neighborood of the patches, and the more intense color of the endothelial nuclei by hæmatoxylin, permit other explanations also. But as it can be proved that the endothelium is destroyed beneath the patches and that a complete restoration usually ensues after recovery from iritis serosa, hardly any other view can be accepted.

It is plain that the deposits follow the general current of the ocular fluids. We see the granules of detritus and pigment lying preferably on the cement lines between the endothelial cells, we see the larger deposits on the one hand very abundant toward the ligamentum pectinatum and on the other hand the region of the paracentesis scar especially abundantly provided with granules, so that we involuntarily think of an increased evacuation through the scar. There is no need of explaining further, that during the evacuation of the anterior chamber, which is on the whole not very rapid, the organized elements which are of the greatest specific gravity, for the most part have time enough to sink, so that the majority of the deposited patches occupy the lower half of the cornea.

The posterior pigmented surface of the iris appears so little changed in comparison with the anterior surface, that we must abandon all idea of its participation in the production of the elements composing the deposits on Descemet's membrane. On the other hand, it is doubtful how far those portions of the ciliary body behind the zone of Zinn participate in the same. Here we see the very same changes as in the iris; here also we see patches of the same elements as in the iris and in the deposits on the cornea. We cannot tell, of course, from an individual element whether it originated in the iris or ciliary body, before we know whether the zone of Zinn is or is not permeable for organized substances, as we know it is for dissolved substances. Although this question is still in suspense, yet on

account of the greater probability of impermeability as supported by anatomical facts, I do not believe that the cells, etc., furnished by the ciliary body reach the anterior chamber, since the density of the deposits of cells and detritus in the vitreous increases from behind forward, which corresponds precisely to a process of filtration. It is probable that the cells which have reached the vitreous body and Petit's canal soon decay, and that their detritus is dissolved and absorbed. We have already seen in the anatomical description of our case, that there may even be deposits on the capsule of the lens in such cases, although they are never of large extent.

In spite of that, it seems probable to me that cells and remains of cells from the ciliary body, and more especially from those portions adjoining the sclera, reach the anterior chamber directly through those fibres of the ciliary muscle adjoining Descemet's membrane. It is hard to say how far this has happened in our case, but I regard this as the probable path for those grayish-yellow granulations at the ligamentum pectinatum, which are so frequently observed during iritis serosa, as well as of those excrescences which resemble the so-called cyclitic hypopyon.

Our remarks about the ciliary body are still more applicable in case of the choroid. Diffuse inflammation of the choroid is present, chiefly limited, however, to the interior of this membrane. The few cells found here and there in the thickened hyaloid, originated most probably from the retina. We can therefore, exclude a direct invasion of the choroiditis upon the retina, because the pigment epithelium is everywhere intact, and the slight local alterations at the temporal edge of the optic nerve, can only be regarded as the beginning of a staphyloma, since myopia is frequently developed during iritis serosa, and allied affections. The enlargement of the sheath of the optic nerve on the nasal side, also favors this view. I believe that I shall have to seek another explanation for the œdema of the retina, which must undeniably have been present during life, and shall be mentioned later.

In the above described inflammatory processes which

centre in the iris and ciliary body, we meet everywhere with the same elements, round cells, pigment and detritus. We can leave aside the local appearance of epithelial cells in Petit's canal, and between the fibres of the zone of Zinn, both on account of their numerical inferiority and limited appearance, and again because they do not form any part of the deposits on the cornea, and on the whole seem entirely passive. I have already remarked that I regard them as products of the cells of the pars ciliaris retinæ.

While in purulent inflammations, the exuded cells with originally one nucleus begin their metamorphosis by division of the nucleus into several smaller ones, I could see nothing of the sort in iritis serosa. I happened at this time to be examining a bulb in the initiatory stage of suppurative choroiditis from a foreign body, and it was very easy to see how the pus cells within the choroid contained almost exclusively but one nucleus, while those in the vitreous body averaged several smaller nuclei, even before they fell into a state of further degeneration. Nothing like this could be seen in our case. The cells retained their large nuclei, deeply tinted with hæmatoxylin, even when dissolving visibly into larger and smaller granules, and the heaps of cells formed clumps of protoplasm in which all contours disappeared, and still the nuclei of the cells were distinctly to be seen.

I would not base any general conclusions on the remarkably different condition of the cells which in both cases had evidently sprung from the same source, for one case was that of a strong man, the other of a chlorotic girl. Still, I regarded it as well worth while to draw special attention to this point, since as on the one hand iritis serosa usually attacks anæmic and poorly nourished people, we should probably meet frequently with this condition of the exuded cells, and on the other hand it interested me to rediscover in a certain degree, the asthenic character of the whole disease, especially in the individual cells of the morbid product.

A degeneration similar to that described in the case of individual cells in the vitreous body and in the deposits on

Descemet's membrane, is also visible in the interior of the tissues, particularly in the iris, where the cells were heaped up abundantly. This is proved by the yellow tinge of the centre of such patches, aud their defect in color after the application of carmine or hæmatoxylin. It is rather hard to disabuse our minds of a certain analogy between this condition, and scrofulous and tuberculous processes; we may even think that we see states of transition; but as I will here expressly mention, I could not detect the least trace of true cheesy degeneration, although I sought specially for it. The process in our case of iritis serosa has a certain peculiarity, in so far as a mechanical decay, a simple dissolution of the cell-protoplasm, seems to have taken place, rather than preliminary regressive metamorphosis by chemical decomposition; still, I do not like to enter too far into this region of supposition without firmer foundations, since we should be led away from our real theme.

The detritus found amidst the deposits on the cornea, originates undoubtedly from the breaking up of the round cells, which happens partially in the aqueous fluid, but chiefly while the cells are still attached to Descemet's membrane. The pigment plays but a secondary rôle in the whole process: it originates from the pigmented stroma cells of the iris, or from the cells of the pars ciliaris retinæ, which, however, only decay secondarily as a result of the collection of round cells. Most of the pigment is free, rarely contained in cells, and forms a subordinate element of the clumps of protoplasm which line Descemet's membrane, and represent the remains of former groups of cells.

The direct action of the deposits is to destroy the endothelial layer directly beneath it; the pathological condition of the cornea so caused is reparable, and often passes off without further results. On the other hand, clinical experience teaches us, that deposits which are very extensive, or last long, or reappear frequently, may be followed by permanent cloudiness of the cornea, which need not surprise us, when we consider the importance of the posterior epithelial layer in the nutritive processes in the cornea.

While these processes so minutely described culminate in iritis serosa toward the ciliary body, we find a second and apparently quite independent centre of inflammation in the optic nerve and particularly in the pial sheath. We refer to a slight, but undeniable neuritis, which the ophthalmoscope proves is rarely, if ever, absent in iritis serosa. The neuritis is pretty well defined against the retina, while in the latter, nothing abnormal can be discovered except a few lacunæ in the most anterior segment, and the strikingly marked formation of folds all over the fundus oculi. These alterations of the retina, which indicate the undoubted presence of a moderate œdema during life, are evidently connected with the swelling and particularly with the excessive infiltration of the optic disc, and are due to the disturbance in the current of the retinal veins thus caused.

The infiltration of the optic nerve itself, extended but slightly into the orbit. The most striking point, however, was the pronounced cellular infiltration of the pial sheath from the optic disc to the chiasma. Since both of the nerves were excised precisely at the chiasma, and the infiltration of the pial sheath at the excised ends showed not the least trace of decrease, but rather an increase within the cranial cavity, *there is no doubt but that the affection in both eyes is continuous and connected.* Unfortunately, the place of connection is absent, so that I cannot tell *how* it occurs in the chiasma. Who could imagine, even on removal of the globes, that an affection hitherto located in the most anterior portions of the eye, would have to be traced along into the chiasma? But *that* this connection exists, is proved beyond all doubt by my preparations; the inflammation then had to cease as if excised with the knife.

No appearances of engorgement could be observed in the papilla, or within the sheath of the optic nerve. The condition was simply that of a more or less intense cellular infiltration of the tissues. My suspicions of an affection of the optic nerve were at first so completely absent, that I really was intending to make cross sections of the normal optic nerve of the eye with the commencing symptoms of iritis serosa, to compare with preparations of

the other side. While thus occupied, I discovered the intense cellular infiltration of the pial sheath, after I imagined the examination of both eyes quite completed.

Neuritis is one of the characteristic diagnostic symptoms of choroiditis disseminata, as also of the early stages of iritis serosa (compare amongst others, Barbar's Dissertation. Zurich, 1873, "On some rarer syphilitic affections of the eye," where—page 13, note—attention is drawn to the frequent discovery of neuritis in *fresh* sympathetic disease, as in the beginning of iritis serosa). We should be obliged to assume either that this neuritis was propagated in all cases from the cranial cavity, or that in our case such a connection had existed accidentally, for which, however, we have no points of support. The appearance of iritis serosa and other diseases exhibiting a similar clinical picture first in the one eye, and only after longer or shorter periods in the other, gives us as much right to assume a transmigration from the first eye affected to the second, as to assume a cause common to both, which naturally need not be active in both eyes simultaneously.

Natural though it is to regret that exact proof cannot be offered, on account of the defective examination of the chiasma and brain, I feel justified in regarding the affection of the optic nerve in this case as independent of any cerebral affection, as peculiar to iritis serosa, and as forming the connection between the affection of one eye and the other.

The small hemorrhage inside the adventitia of a small artery in the right foramen opticum, to which we can scarcely attribute any significance, is evidently only the result of violent coughing and stagnation of blood from impeded respiration. It is evidently still fresh, probably originated shortly before death, and may be compared with a small hemorrhage beneath the conjunctiva bulbi, which might have originated under the same circumstances.

Something still remains to be said about the connection between the affection of the uvea and that of the optic nerve in our case. This also we have to regard as continuous. The infiltration of the choroid is directly contin-

uous with the infiltration of the entrance of the optic nerve, which as was already mentioned, is confined to the papilla, ceases rapidly toward the retina, and decreases gradually toward the orbit. The infiltration of the optic nerve is most pronounced at the lamina cribrosa, and surely we have not to depict this region to ourselves as if a piece of choroid were punched out. The microscopic examination shows on the one hand that an important connection exists at this region between the optic nerve and choroid. The experiments of Schwalbe, Michel, Key and Retzius show most clearly that fluids injected into the optic nerve pass into the choroid and its lymphatic spaces. The penetration of the fluid into the retina, limited itself in these experiments to the district which in our case was the only one infiltrated, viz., the papilla of the optic nerve and its immediate neighborhood.

If we consider that the pial sheath of the optic nerve, as well as the choroid, are analogous to the pia mater of the cerebrum in origin and function, we need not be surprised at this seemingly paradoxical transmission of an inflammation from one membrane to the other. To make the analogy perfect, the pia mater, according to Kölliker, is sprinkled throughout with pigment cells. I can confirm this fact, as especially concerns that portion of the pia adjoining the chiasma. These pigment cells are perfectly identical with those of the supra-choroid.

Hence it follows that we should recognize iritis serosa as a disease exhibiting itself as a continuous affection of both eyes. The clinical and anatomical inflammatory centre lies, it is true, in the iris, ciliary body and the other tissues adjoining the corneo-scleral junction, but we can follow the inflammatory appearances through the choroid, optic disc and pial sheath of the nerve to the chiasma, where the two affections come into contact. Iritis serosa is an exclusive affection of the uveal tract, in a wider sense, since I regard the pial sheath of the nerve as included in this term. All affections of the other structures in the eye, of the retina, cornea, vitreous body, and eventually of the lens are secondary, and so to speak, of a passive nature. The inflammatory product

furnished is everywhere the same; round cells with one nucleus, and some pigment derived in all probability from the stroma cells of the uvea, which decay passively, and consequently are not noticed in the infiltration of the pial sheath of the optic nerve. We have moreover to assume an increased filtration of fluid from the iris and choroid. The cells furnished in iritis serosa seem to be of a very perishable nature, perhaps from the generally defective nutrition of most patients affected with this disease, and hence wherever the cells are met with outside of their native soil, especially in the vitreous body, aqueous humor and in the deposits on the posterior wall of the cornea, we find their abundant ruins in the form of detritus, in which the nuclei are still demonstrable for a proportionally long period. A characteristic peculiarity of this cell degeneration in iritis serosa, is *perhaps* that, as has been before mentioned, the nuclei do not undergo segmentation as in other affections.

But while the cells exuding from the vessels in the choroid are filtered in moderate amount through the lamina elastica, pigment epithelium and the retina, we see them exude abundantly, on the anterior surface of the iris into the aqueous humor, and partially form the characteristic deposits. In this stage at least, the posterior surface of the iris still remains chiefly intact, and for this reason, I am inclined to ascribe to the anterior surface of the iris, the chief share in the production of so much of the aqueous humor as is furnished by the iris. Cellular elements, however, reach the refracting media of the eye from the ciliary body and choroid also, and this condition increases, the nearer the part of the uvea concerned lies to the insertion of the iris, whereby perhaps, the thickness of those tissues alone decides through which of them the cells shall pass. The collection of cells in the most anterior portions of the vitreous and in Petit's canal, is easily explained by the direction of the current of ocular fluids from back to front.

A noteworthy point in our case is the excessive infiltration of the pial sheath of the optic nerve, and also of the choroid in the secondarily affected eye, which seems so much

less affected than the other in so far as concerns the corneal deposit. It seems as if the affection of the left eye which came on first and intensely, gradually passed over to the right eye by way of the pial sheath, a process which grows more and more plausible to me as I reflect upon it, and which moreover is not to be rejected without further argument in the case of other uveal affections ensuing in both eyes after a certain interval of time. I lately saw a case of the choroiditis disseminata of anæmic women at the age of puberty, which offers many clinical points of striking resemblance to iritis serosa, and which also makes us inclined to accept such a view. A pronounced case of choroiditis disseminata of the left eye in a girl of 17, was observed and treated for a long time in the Zurich hospital. The right eye was perfectly normal: S. $\frac{1}{1}$. I had often exhibited the patient at the ophthalmoscopic course, and made use of the comparison of both papillæ, to demonstrate the left-sided neuritis. The acute condition of the left eye was relieved, and the patient discharged. She returned a fortnight later with a relapse on the left side, the optic nerve exhibited a pronounced "choked disc:" the right eye showed excessive redness of the papilla, ill-defined contours, tortuous and engorged veins, in a word, a pronounced but moderate neuritis. The whole fundus oculi was then examined repeatedly and carefully, even with the help of atropine, but no trace of choroiditis could be discovered; a fortnight later, however, numerous fresh, choroiditic patches were discovered in the equator of the globe. It would be easy to observe many similar cases of recent date: I have only cited this one here, because being lately observed, it is still fresh in my remembrance, and moreover, the condition of the parts described was very striking. Beyond this, I shall not enter into a closer description of the relations of iritis serosa to other forms of choroiditis, but refer it to a second part of this paper, where I shall describe the much more interesting clinical details of a case of choroiditis disseminata specifica, which I also examined anatomically.

Iritis serosa and glaucoma are alike in being localized chiefly around the insertion of the ciliary muscle, and have

corresponding points in frequent anomalies of tension. In our case, which was noteworthy for the permanent diminution of tension in both eyes, numerous cells were found in the corneo-scleral junction, and between the fibres of the ligamentum pectinatum; but the angle of the iris was open, and the anterior chamber deeper than normal, so that exudation from Fontana's space must have been facilitated, rather than restrained. Then again, increased tension of the globe, with frequent fluctuations toward both extremities, is often observed as one of the symptoms of iritis serosa, in the course of which the glaucomatous appearances may increase to such a degree, that at last the whole morbid picture of glaucoma predominates. Such cases are naturally more often seen in young people, and it is not at all necessary that complete exclusion of the pupil by circular synechia should form the connecting link. The latter shows especial inclination to very gradual glaucomatous degeneration, while all forms of glaucoma, even the most acute, are occasionally observed in the course of iritis serosa.

The condition described in our case of iritis serosa is of the greatest importance in making a critical examination of sympathetic affections, which still lie enveloped in great obscurity. In the first place—of course only such cases have a real value in which the sympathetic ophthalmia had really broken out in the other eye—the eye first affected is examined only after a long time, when it is, from the nature of the case, more or less wholly destroyed and complicated with considerable inflammatory symptoms in its whole neighborhood; at its enucleation, only a relatively small portion of the optic nerve is removed, and the inflammatory symptoms on the papilla, moderate in comparison with the general affection of the eye, attracted attention so much the less as the nerve substance itself, to whose specific energies we have believed that we must ascribe the transmission, may remain wholly intact. The secondarily affected eye, naturally so much the more important of the two in a critical examination of sympathetic ophthalmia, rarely undergoes an anatomical examination, and is only accessible to clinical observation. This, however, shows us that

the disease in the second eye almost invariably begins with the picture of iritis serosa. In the usual cases of iritis serosa also, one eye becomes affected first, and the lapse of time until the other also becomes affected, shows a certain equality with that in cases of sympathetic opthalmia, where the latter is the direct result of a wound, and does not ensue at a much later period in consequence of secondary changes. The usual interval in both diseases is from four to eight weeks; the many exceptions, which are easy to explain, have no further influence upon our conclusions.

If we now note the circumstances, that *iritis serosa represents a continuous affection of both eyes along the pial sheath of the optic nerve*, we can easily explain a whole series of peculiarities which appertain to sympathetic inflammation of the eyes: its appearance after a certain space of time, its occasional commencement as neuritis, its outbreak in spite of the enucleation of the eye primarily affected, and the impossibility of cutting short the process, when once begun, by the removal of the wounded eye. We do not have to assume that a certain hypothetical alteration appears at some unknown spot from irritation of the ciliary nerves, which then alone causes the affection of the other eye; the simple paths of continuous and advancing inflammation long since indicated can do the same.

I would here refer especially to the disproportion between the clinical and anatomical conditions in the right eye of our case. We had here even more than normal S., the deposits were but few and small, and yet the alterations in the optic nerve, papilla and choroid were quite as pronounced as in the other eye; in spite of that, the condition in the anterior portions of the eye indicated fewer inflammatory symptoms, which involuntarily raises the thought that the inflammation had advanced from the posterior to the anterior portions of the globe.

The question whether sympathetic inflammation can also appear, or rather begin, as neuritis, likewise becomes much simplified in the light of these facts. As neuritis is one of the signs of iritis serosa, the controversy naturally reduces itself to whether, when we have the ophthalmoscopic picture

of neuritis, deposits are already present in Descemet's membrane. These are met with in by far the larger number of cases, but we can readily imagine that they will be absent now and then in a single case, without compelling us to alter our views as regards the case concerned. We might indeed be justified in assuming such an affection as iritis serosa "without deposits," since we have seen that iritis serosa is an affection of the whole uveal tract, and that the deposits represent, as it were, something secondary. All conclusions therefore which shall be dependent upon the appearance of a sympathetic primary neuritis, appear to rest upon a weak foundation. The further appearances which soon ensue in such cases, are those of iritis serosa, which then runs its course so deleterious to the eye. For the distinction between our case of iritis serosa and the most violent irido-choroiditis, as observed in sympathetic ophthalmia, is only *quantitative*. I lay especial emphasis upon the fact that we are here concerned *with a neuritis*, and *not with a retinitis*. Those symptoms which might be referred to the retina are surely due to *cellular infiltration of the choroid*, which, as we have already seen in our case, offers no ophthalmoscopic alteration.

Hermann Pagenstecher has lately described (These ARCHIVES, vol. viii, part 2, page 242) a case of "*Rupture of the optic nerve*," with subsequent sympathetic inflammation of the other eye, and has concluded that sympathetic affection could not be conducted along the optic nerve. Now from what has just been said, and taken in connection with the fact that in Pagenstecher's case the sympathetic affection came under observation within four weeks, *i.e.*, in a proportionally very early stage, I feel justified, on the contrary, in offering an explanation which cannot be called forced: that *rupture of the optic nerve also can become the cause of a sympathetic affection*, which in such a case would naturally appear earlier than usual.

The extraordinary similarity of the symptoms of inflammation and infiltration observed in the optic nerve, the retina and choroid, with the pictures obtained by injections into the optic nerves with Berlin blue (*when*

the fluid penetrates into the optic discs) led me to inject the optic nerves *in a centripetal direction*, in order to study a possible passage from one optic nerve to the other, through the chiasma. We may here mention as noteworthy, that up to this time the lymphatic tracts of the optic nerve have only been examined by injections into the nerve and its vaginal spaces in a *centrifugal direction* (Schwalbe, Michel, Key, Retzius, etc.)

Preliminary experiments have now shown that Berlin blue passes easily and rapidly from one optic nerve to the other. The pictures obtained in the second nerve, bear perfect resemblance to those obtained in direct injections into the optic nerve in a centrifugal direction. The blue passes much less deeply into both optic tracts, and in the chiasma, especially in its anterior portions, the connection between the two nerves can be demonstrated without further experiment. In so far as I can see, we are not here concerned with channels closed on every side, but with tissues which, by virtue of their structure, permit or hinder the passage of the fluid in a varying manner in varying directions. The latter diffuses itself most rapidly along the relatively wide and straight serous canals in the nerve, while its passage into the intricate serous spaces in the neuroglia is very much impeded; the same condition also probably exists at the passage of the optic nerve into the retina. (Compare amongst others, the beautiful sketches in the great work of Key and Retzius on the Lymphatics.)

My experiments on these points are not yet finished, and I shall make further reports concerning them in another place.

Mauthner (Lectures on Sympathetic Ophthalmia, p. 59), begins his description of the pathology thus: "Let us suppose that the ophthalmoscope revealed to us a retinitis and neuritis in the eye sympathetically affected, and that we were justified in assuming that the retina and optic nerve of the eye first affected (the deeper structures of which we are usually unable to examine) also suffered from an inflammatory process, we should not need a profound theory or the bringing in of other obscure symptoms from other

regions of pathology in order to understand such a condition." Further on (page 60), he says: "It is all one and the same thing for our present consideration, whether the process, after reaching the chiasma, advances or not, toward the centre of the visual organ in the tractus opticus concerned; but this much is certain, that, so soon as the fibres of the second optic nerve are attacked in the chiasma, the inflammatory process there present can spread not merely toward the tractus, but also toward the globe." Page 61: "The simple invasion of the choroid by inflammation from the retina, is so common, that if a corresponding view could be allowed in the case of sympathetic uveal affections, all the obscurities of the latter disease would disappear, and sympathetic inflammation could be regarded simply as propagated continuously and *per contiguum* through the chiasma from the irritating eye. Yet, although the affection of the optic nerve in the first and the secondly affected eye is still too little appreciated, it is a fact that sympathetic irido-cyclitis does not originate in this way. For at the time when the premonitory symptoms appear, no inflammation, or at least only an unimportant inflammatory state exists in the retina. And why should not the most essential symptoms appear in the choroid proper, which lies in extensive connection with the retina?"

Mauthner finally concludes (page 75), that a transmission may be effected along the ciliary, as well as the optic nerves and really is effected simultaneously or after short intervals. "Irritative and inflammatory conditions are propagated along the optic nerve from the opticus-retina, while the inflammatory processes which are observed in the regions of the eye pervaded by the ciliary nerves, principally in the uveal tract, are propagated along the ciliary nerves."

All these conclusions, however, are based merely on clinical conditions, and almost exclusively negative pathological and anatomical conditions. The latter, which alone could throw light upon the matter, have hitherto left us in the lurch, and after mentioning the whole series of possibilities concerning even the ciliary nerves, Mauthner, without deciding directly for one or the other view (page 79), thinks

that "dark and complicated as the method of propagation of the inflammatory process along the ciliary nerves may now seem, the matter is relatively simple in the case of the optic nerves."

If now we venture to base any conclusion on our researches, as regards the process in a sympathetic affection, —and from what has been said we shall seem to be forced to do so—then, as so often happens, *the simplest mode is the most correct.* The view of the direct propagation through the optic nerves which appeared most probable to Mackenzie, would once more be restored to its rights. If moreover as seems probable, such a transmission from uvea to uvea can be proved in other affections by intervention of the chiasma, (*ante:* p. 144 and 145), sympathetic ophthalmia loses its individuality amongst diseases of the eye, and all the secrecy and obscurity that up to this time has enveloped it. The name "sympathetic" ophthalmia, which in its allusion to the specific energies of the nerves, included the idea of a pure reflex *neurosis*, must yield to the purely pathological and anatomical title "*Uveitis bilateralis continua*," which at the same time also explains the clinical symptoms in the most satisfactory manner.

Further researches, however, must show whether these reflections prove true or not, since the case under consideration being still isolated, cannot, of course, be regarded as decisive.

We dare not, indeed, affirm that all the symptoms of an incipient sympathetic affection, and especially the prodromal symptoms, are exclusively caused by direct propagation of the inflammation along the optic nerve; on the contrary we shall be obliged to reserve much for the ciliary nerves, the nerves of the vessels, perhaps also for the specific energies of the optic nerves; numerous analogies for such processes being at hand. The real danger, which when the disease has once broken out, cannot be averted even by removal of the eye, lies in the continuous advance of the inflammation in the connective tissue and lymphatic apparatus of the optic nerve. Both processes appearing simultaneously or with but temporary intervals, compose the clinical picture of sympathetic ophthalmia.

We saw in iritis serosa an inflammation of the whole globe; all its parts were found more or less altered, with the exception of the lens which, however, appears frequently affected in later stages of the disease. The seat of the inflammation is in the uvea: but we can demonstrate its continuous propagation through choroid, papilla and optic nerve, along the chiasma to the affection of the other eye, a process which up to this time was only known of certain gliomata. The exuded cells in the case under consideration showed certain peculiarities, but we cannot decide whether they are to be ascribed to the general constitution of our patient, or whether they are characteristic of the disease as such.

Iritis serosa has this in common with glaucoma, that the region of the insertion of the iris participates in the affection, and that great variations of tension are often observed. To speak accurately, we must call iritis serosa an uveitis serosa in the widest sense of the word, in opposition to the purulent form, between which, however, only quantitative differences exist. We find here such conditions as were supposed to occur in glaucoma at a time when this affection was described as a choroiditis serosa.

The condition of the parts in our case is most weighty and valuable in explaining the origin of sympathetic affections. The anatomical proof of a direct continuity in the inflammation of both eyes appears to me of fundamental importance, in which, however, much remains to be done by future researches; the last foothold would then be torn away from the theory of inflammatory irritation by direct nerve influence, which up to these days has maintained a superiority scarcely opposed.

We cannot unconditionally refuse to accept a continuity in other double uveal affections, which begin with neuritis, and do not occur simultaneously. Various conditions to which attention was drawn at the proper place, would thereby be easily explained. Whether under these circumstances specific infectious substances pass from one eye to the other, or whether only quantitative differences are present, cannot be decided; examples can be cited which bear on both sides. At all events, the facts hitherto known are important enough to encourage further researches in various directions.

Explanation of the Drawings.

Fig. 1.—*a*—*e*: Patches on Descemet's membrane; *a*, from the surface; *b*—*e*, sectional preparations; H, corneal tissue; D, Descemet's membrane; E, its epithelium; A, deposits—$\frac{320}{1}$.

Fig. 2.—Perpendicular section through the paracentesis scar, $\frac{60}{1}$. For explanation, compare text.

Fig. 3.—Portion of a meridional section through the ciliary body and adnexa; mc, ciliary muscle; B, loose connective tissue interspersed with cells; P, pigment layer; H, H, patches at the ciliary origin of the zone of Zinn, $\frac{120}{1}$.

A NEW EYE BANDAGE.

By SAMUEL THEOBALD, M. D., of Baltimore, Md.

THE very unsatisfactory action of the various bandages which have been heretofore employed for the purpose of retaining dressings upon one eye, when it was desirable that the other should be left open, more especially their tendency to slip out of place and become disarranged, led me recently to contrive the one which I now bring to the notice of ophthalmologists, and which I trust others will find as useful as I have done. Though especially devised as a bandage for one eye, it is equally well adapted to the closure of both; and for this purpose is more convenient, I think, in some respects, than the bandage of Liebreich. The material of which it is made is a matter of minor importance. I would recommend, however, thin elastic flannel, except in hot weather, when linen or other light material may be used.

FIG. I

The bandage, as shown in Figs. 1 and 2, consists of a head-piece,

to which are attached the tapes, and an eye-piece, in the ends of which there are buttonholes or slits, through which the tapes are passed. When both eyes are to be closed, the eye-piece should, of course, not be shaped as represented, but should be larger and rectangular, as in Liebreich's bandage.

To make the head-piece, take two straight strips of the material selected, 12″ (30½ *cm.*) long and 2″ (5 *cm.*) wide; place the end of one strip upon the end of the other so that the two shall form a right angle, and sew them together in this position. Do the same with the other ends, and then, having truncated the angles thus formed, sew on the tapes, which should be about 24″ long, where the corners have been cut off. A cap-like arrangement will thus be formed, which will fit almost any head. For children the strips may be somewhat shorter and narrower. When both eyes are to be bandaged, this is placed on the back of the head like a nightcap, and the tapes having been carried forward over the ears, and passed through the buttonholes of the eye-piece, are brought back in the same manner and tied either behind or at one side, as may be more convenient. When only one eye is to be closed, as for instance the right, over the opposite or left parietal eminence, with one angle it is placed over the left side of the forehead and the other approaching from behind the right mastoid process. The upper tape, after passing through the buttonhole in the eye-piece, is then carried across the forehead and over the left ear to meet the

FIG. 2

other tape, which comes forward under the right ear, and is carried back in the same direction. These may be tied as well at the side as at the back, so that in changing dressings the head need not be raised from the pillow, there being, of course, no occasion to disturb the head-piece. By making a number of short parallel cuts in the central portion of the eye-piece, as shown in Fig. 1, the tension, which is here greater than at the margin, is lessened, and the pressure upon the eye is more evenly distributed.

The advantages which I claim for this bandage are: That it is easily applied, and admits of the eye being dressed with the least possible disturbance of the patient; that by changing the eye-piece only, it may be used either for one or for both eyes; that it is more comfortable, and is less apt to become disarranged, than any other form of mon ocular bandage; and that the pressure which it exerts is so equable, and can be so well regulated, that it fulfils all the requirements of a pressure bandage, as well as one simply for the retention of dressings.

I may add that by modifying somewhat the shape of the eye-piece, it can also be used to bandage the nose, the mouth, or the lower jaw.

A CASE OF ACUTE CHEMOSIS.

By SWAN M. BURNETT, M. D.

Lecturer on Ophthalmology and Otology in the Medical Department of Georgetown University, Surgeon-in-charge of the Ophthalmic Division Central Dispensary, and one of the Consulting Ophthalmic and Aural Surgeons to Providence Hospital, Washington, D.C.

IN the June number of the *Klin. Monatsbl. f. Augen heilk.* for 1870, Dr. Zehender relates a case of what he calls "acutes Bindehautœdem," the history of which is briefly as follows:

The patient was a man of 55 years, and a convalescent from an attack of left-sided pneumonia.

On April 6th, in the evening, he was seized with symptoms of a severe catarrh, accompanied by headache. The next day a considerable chemosis was noted, which increased until the conjunctiva extruded like a bladder from between the lids. On the 10th it had reached its maximum. On the 12th the œdema had entirely disappeared from the left, and on the 14th from the right eye, leaving a marked conjunctival injection.

The only treatment was atropine and rest in bed. There was no heart trouble, and no signs of pyæmia.

As I can find no account of any similar cases in the literature at my command, I judge them to be rare, and as they are interesting on account of the obscurity of their causation, I am led to record a case that fell under my observation a year ago, which bears a great similarity to that of Zehender just related.

Mr. G. D. M., a young lawyer of 29, small of stature and of a nervous temperament, had been studying with undue vigor for months past, working, he states, continuously about 20 hours out of the 24.

Four weeks previously he had a throat trouble, terminating in abscess, which was followed by an inflammation of the right eye. Some "smokiness" in the vision of this eye caused him to consult me. V.=$\frac{1}{4}$. Externally the eye was normal, but with the ophthalmoscope all around the periphery of the choroid of *both* eyes, atrophic spots were seen, and in the vicinity of the macula of the *R.E.* there was an apparent thinning of that membrane and a few fine points of pigment. The V.F. was perfect, and both eyes were emmetropic.

Ordered smoked glasses and complete rest. As there was also an evident malarial complication, he was ordered good doses of quinia.

On April 29th, three days after I first saw him, I was called to see him at his house, he being unable to leave his room. I learned that on the previous evening, at 9 o'clock, he had been seized with an intolerable pain in the *left* eye and left side of the head. which had persisted throughout the entire night. He had nausea and rigors which were apparently nervous in their character, and were not followed by any notable elevation in temperature. The eye was exceedingly sensitive to light, but there was no very considerable injection of the conjunctiva and the pupil responded promptly to light. I ordered opiates, hot applications, and a continuation of the quinia. On the morning of the 30th I found the lids somewhat red and swollen, and a marked chemosis which was almost perfectly clear. The photophobia was the same, but the pain was less. On May 1st the condition was unaltered, but on my visit on the morning of the 2d I found the photophobia almost entirely gone and the chemosis greatly diminished. No pain whatever, appetite returning, which before had been lost. Vision was not then tested, but on the 5th, when he visited me at my office, I found it $\frac{1}{4}$. There was a very slight conjunctival injection, and the ophthalmoscope showed a slight haziness of the vitreous. In the course of a week both eyes had V.=$\frac{1}{4}$.

He now says that the attack in the other (right) eye some weeks ago was very similar in its character to this.

The causes usually in operation for the production of the chemotic condition are obstructions of some character to

the return of blood through the veins, such as inflammations of the uveal tract and of the conjunctiva itself. These are what Shiess * calls *active* or inflammatory causes, in contradistinction to those causes which are unattended with signs of inflammation and are called *passive*, because the fluid exudes passively through the walls of the vesssls as in ordinary cases of œdema from relaxation of the vascular walls.

In the case just related we have no substantial evidence that either one of these causes was in predominant operation. That there was not an inflammation of any part of the uveal tract of sufficient violence to cause obstruction of the venous circulation, is abundantly shown by the fact of the abrupt termination of the symptoms, and the want of objective evidence. There was some turbidity of the vitreous it is true, but that I account for by a condition of the interior blood-vessels similar to that of the outer coats of the eye which allowed transudation of fluid into that cavity.

It is more than probable, however, that the pathological condition of the ant. portion of the choroid played the part of predisposing cause, for evidently, judging from the ophthalmoscopical appearances, morbid changes were slowly taking place there. These however, were not in and of themselves sufficient to cause the circulatory obstruction necessary to the chemosis. I look upon the neuralgia of the fifth pair (probably of malarial origin), as the exciting cause.

It is well-known that neuralgia of the fifth pair is often attended with a hyperæmia of the conjunctiva. Under ordinary circumstances, this undue determination of blood is carried away by the veins without any serious trouble. In this case, however, owing to the diseased condition of the ant. portion of the choroid, the veins were probably unequal to the task imposed on them and a chemosis was probably the result. At least, I think we are justified in the opinion that the condition was due largely to deranged vaso-motor influence.

* *Klin. Monatsbl. f. Augenheilk*, 1872, p. 1–7.

A CASE OF INTRA-CRANIAL TUMOR, WITH SYMPTOMS CHIEFLY ON THE PART OF THE EYES, SEEN DURING A COURSE OF FIVE YEARS. DEATH. AUTOPSY.

By JAMES A. SPALDING, M. D., Portland, Maine.

MR. A. B., æt. 20, a young and perfectly healthy man of good habits, consulted me February 6, 1875, for double vision, which he had noticed within a few hours. He was working at his desk as usual that morning, when he suddenly saw all objects double, and had to close his left eye to enable him to continue his work. I found partial paralysis of the external rectus, (6th pair) of the left eye. The innervation of the other nerves of the eye was unimpaired. S. $\frac{20}{20}$ with both eyes, Sn. 1½ both, and refraction emmetropic. As the patient knew of no possible cause for the affection, except that the left side of his face had been much exposed during a long and cold sleigh-ride of a day or two before, I felt justified in assuming that the affection was due simply to the exposure. He denied any specific disease, did not drink, and smoked very moderately. I ordered ferrum, strychnia, and quinia, and the use of the interrupted current.

February 20th.—I saw the patient again, and found but little improvement, the double images being as far apart as before. The previous medicine was abandoned, and potass. iodid. 0.60 ordered thrice daily. I also took into my own hands the application of the interrupted primary current every other day. The negative pole was applied over the temporal bone, and the positive pole over the entire orbital region. At the end of ten days the diplopia had disappeared, and the power of the external rectus, when tested with prisms, was found fully equal to that of the right eye. The patient now resumed his usual occupation.

Looking at the case in the light of the more serious symptoms that appeared in later years, I will mention here, that I discovered at this time a slight lack of power in the flexors of the left hand, when compared with those of the right hand, but the patient assured me, that his left hand had been weak ever since a fall several years before, when his left cavicle was broken. The left arm, also, had been somewhat stiff since the same accident, and its lack of movement was quite noticeable when he walked along the streets.

August 20, 1875.—The patient reported again, saying that his eyes had given him no trouble since March, until the day before reporting, when, while writing, he suddenly saw double images as before. He attributed it to working at a desk, which was considerably exposed to the hot sun. There was no history of exposure to draughts or specific disease. The patient smoked three cigars daily, but did not drink. The *right* eye was the one now affected, exhibiting the usual symptoms of complete paralysis of the third pair. The diplopia was not noticeable, except when the paralyzed upper lid was raised above the edge of the enlarged pupil. I ordered the same treatment as before, and applied a solution of the extract of calabar bean, 4:60, to the eye. Eserine was not then to be procured. In a few days, the motion of the upper lid increased, and the eye could be turned very slightly inward. This improvement was, however, transitory. The pupil remained partially contracted for an hour after applying the calabar bean solution, which, however, irritated the conjunctiva a great deal, and had to be omitted. I continued the treatment with larger doses of potass. iod. 0.75 and 1.00 *ter in die*, and increased the strength of the interrupted current. The continued current was also employed. All remedies proved of no avail, and the patient now consulted specialists and general practitioners in other cities; one suggesting an advancement of the internal rectus, a second an operation for ptosis, a third diagnosticated an obscure heart disease.

October 13*th*.—The patient reported with the same eye symptoms as before, but now began to complain of very violent deep-seated headaches, which occurred nearly every day, though they did not last more than a few hours. There was no sleeplessness; no tenderness over any portion of the skull; bodily functions normal, except, of course, those of the right eye.

April 25, 1876.—S. $\frac{20}{40}$ in both eyes, but the right eye is still

excluded from the act of vision by the ptosis, which is, however, less marked than before. Ophthalmoscopic examination showed no appreciable change in the media, fundus or optic disk.

July 6, 1878. Mr. B. has been under the charge of magnetic and homæopathic physicians since his last visit to me. His condition has remained about the same. He consulted me this day, as he noticed yesterday that he had suddenly grown "short-sighted" in the *left* eye. He "cannot read, even for an instant, at the usual distance of holding the book or paper." He had been working very closely for a long time, and to this, he attributed the new symptoms in his left eye. I discovered slight mydriasis; the pupil would contract very sluggishly and very slightly, when the reflection of a flame was thrown into the eye from the mirror. There was not the slightest paresis of the ocular muscles. S. $\frac{20}{30}$, not improved by glasses; Sn. 6 at 12″; with convex 14, Sn. 1½.

The ophthalmoscopic examination was negative in the right eye; in the left eye the retinal veins were very much engorged, arteries normal; optic disk rather hazy around the edges. This condition of the disk could not be called a neuritis, but it looked suspiciously. After using eserine 0.06:15, the patient could read Sn. 1½ for some time. But he soon gave up its use, and read and wrote by the help of convex 20. Once more the patient passed from my view, and continued treatment under directions of a general practitioner. I saw him occasionally on the streets; he told me that he was at his usual work. It seemed to me that his left foot dragged somewhat in walking, but he could not notice it himself. The headaches were much rarer than before, and usually of very short duration.

April 23, 1879.—I saw the patient once more, and now at his own home. He was standing at the head of the stairs about New Year's day, when he began to feel dizzy, lost consciousness, fell down a step or two. and then rolled to the bottom of the stairs, without, however, breaking any bones or suffering any appreciable internal injury. Since then, he has had loss of motion on the whole left side, but has remained sensitive to pricking and pinching. He has entirely lost the power over the flexors of the left arm and hand, but the right arm and hand are very strong. I found him seated in a chair, in which he kept moving, as if uncomfortable in every position. He could push his tongue out straight, but there was a queer movement of the left cheek, suggesting facial paralysis. He could still whistle perfectly, but when

he laughed it was with the right side of his face only. The ptosis, and other symptoms of the *right* eye were unchanged. S.=p. l.; the media were clear, and the optic disk showed a perfect example of bluish-white atrophy, with a small (nasal) crescent; the disk was largely and deeply excavated; lamina cribrosa very well marked, veins normal, arteries very thin and straight in their course over the retina; at one or two spots they seemed completely obliterated, but could be discovered after very close observation. *L. E.* slight nystagmus, especially when attempting fixation; Se. $\frac{1}{10}$; pupil dilated ad maximum, media clear, fundus pale, disk bluish-white on temporal side, while the whole nasal side showed the so-called "woolly" disk. The arteries running over and away from the atrophic portion of the disk were very much thinner than those on the opposite half; the veins over the whole disk and fundus were enlarged and tortuous. The headaches had entirely disappeared.

I saw the patient for the last time during life January 19, 1880. During the summer and fall of the previous year he had rallied a great deal, could walk about for a short time, and seemed improving. In October he began to suffer from sleeplessness. I now found total hemiplegia of the left side, with partial anæsthesia. The facial paralysis on the same side was complete; the tongue was almost immovable; dysphagia was also present. His memory was still remarkably good; speech very defective, chiefly confined to "yes," "no," and "first-rate." Hearing was perfect in both ears. S. was absolutely lost in both eyes. The right eye was not examined with the ophthalmoscope; the left disk was found in a state of complete atrophy, precisely like that previously observed in the right eye.

January 29th.—The patient died at 6 P.M.

January 30th.—Autopsy at 4 P.M. by Dr. Dudley, with the following result, the head alone being examined: The cranial cavity was found filled to its utmost capacity with the cerebrum Externally, the dura mater was uneven and lumpy, and the left hemisphere more prominent than the right, measuring 2 *cm.* more from the longitudinal sinus to the left ear, than the right. The venous congestion was extreme. The dura mater on the left side, near the longitudinal sinus, was adherent over a small district, and a cross-section showed it much thickened. The hemispheres were removed, and a tumor measuring 6 *cm.* in height, and 15–18 *cm.* in circumference, was found, extending from the anterior

clinoid process to within 2 *cm.* of the foramen magnum, and encroaching laterally upon the apices of the petrous portion of the temporal bones. It had invaded the body of the sphenoid bone, and neighboring portions of the temporal bones, so that, at the spots implicated, they were quite friable, and easily broken down by the handle of the scalpel. The tumor was located beneath the dura-mater, and had carried all the neighboring structures above it. It had, as it were, two lobes, the right lobe being 1 *cm.* higer than the left, and *very* hard, almost as hard as dense bone, while the left lobe was much darker and quite friable. The optic nerves, commissure, optic-tract, olfactory nerve, etc., were very much thinned and ribbon-shaped. A second tumor, as large as an English walnut, was found imbedded in the anterior and inferior surface of the left hemisphere, and surrounded by a large clot of blood. The brain-substance seemed normal on section. The family physician told me that he afterward found a small piece of bone, in the larger and harder right lobe of the tumor.

This case seems worthy of a few remarks, from the fact that the intra-cranial tumor first revealed its presence by symptoms on the part of the eyes, and also on account of the doubt which surrounded the causation of the case when it first came under observation. In the beginning, it was difficult to decide whether the paralytic symptoms on the part of the left external rectus were due to an intra-cranial disturbance or to exposure to cold, *i.e.*, the so-called rheumatic paralysis. As regards the possible rheumatic origin of the paralysis, we were supported by the fact that the patient had been driving in very cold weather, and during a storm. Similar exposure often leads to paralytic symptoms. Moreover, the symptoms disappeared rapidly and completely, after the exhibition of the remedies which are usually regarded as beneficial in affections of rheumatic origin. Finally, in a negative point of view, some authors emphasize the difficulty of fusing the double images, even with prisms, in case of a cerebral lesion, or one from pressure. In our case the images could be so fused. The only doubtful symptom was the weakness of the flexors of the left hand, but we must here trust to our patient's assertion of an accident, and to his emphatic denial of its pos-

sibly specific origin. Now, on the other hand, we must not forget, that intra-cranial tumors, in the course of their development, often cause obscure and temporary inflammations, œdema, and local exudations, exhibiting themselves by various capricious symptoms, which appear and disappear oftentimes with considerable rapidity. It must be confessed that, at first, I was inclined to ascribe the paralysis of the left external rectus to exposure, as most plainly indicated by the history, but the entire subsequent course of the case, and the results of the autopsy, leave no doubt but that the paralysis was the first symptom of the development of the intra-cranial tumor, relieved possibly for a time by the exhibition of those remedies which seemed indicated as most suitable.

Six months later, we had an entirely different, and more conclusive symptom—complete paralysis of the third pair of the right eye. This continued while the case remained under observation, although the innervation of the levator palpebræ superioris afterward improved slightly, and gave the patient delusive hopes of recovery. The ophthalmoscopic examination at this time showed nothing abnormal. Violent headaches were now noticed for the first time.

Three years later, July, 1878, an intra-cranial or cerebral disease could be diagnosed with great probability. We now had the additional symptom of mydriasis, and espepecially an engorgement of the vessels of the *left* optic disk, predicating neuritis, which is now commonly regarded as a symptom of cerebral tumor. The right optic disk was normal in its appearance. Partial paraplegia was also indicated by the dragging of the left foot. Taking all these points into consideration, the probabilities of a cerebral tumor were at this time suggested to the friends of the patient.

It is a matter of regret that another ophthalmoscopic examination could not be obtained until April, 1879, for during that time it is certain that optic neuritis had been present in the right eye, as was evident from the broken contour of the atrophic disk, as seen at the later date. Still, we could now obtain in the left eye a most perfect pic

ture of retrograding optic neuritis, limited to the nasal half of the disk.

The further symptoms, hemiplegia, partial anæsthesia, left facial paralysis, etc., were but symptoms of hidden pressure upon the cerebrum, trunks of the larger cerebral nerves and medulla oblongata. It is unfortunate, in completing the record of the case, that a microscopical examination of the tumor could not have been made.

SALICYLATE OF SODIUM IN THE TREATMENT OF IRITIS.

By JULIAN J. CHISOLM, M.D.

PROFESSOR OF EYE DISEASES IN THE UNIVERSITY OF MARYLAND.

SALICYLATE of sodium has accomplished good work at the Presbyterian Eye and Ear Hospital of Baltimore, in the treatment of acute scleral and iritic inflammations.* In the latter disease especially has its effects been the most satisfactory, and its controlling action the most prompt. Its good work has been exhibited in cases of idiopathic iritis, whether the inflammation originated from specific poisoning or from other internal causes. In many cases the disease, when at its height, is influenced so readily that, in the course of 24 hours, a marked improvement is experienced in the symptoms, with relief from pain and a subsidence of the injection, a satisfactory evidence that the paroxysm of acute iritis has had a serious check. In comparatively a few hours convalescence sets in, and is steadily progressive to a speedy and perfect cure of the acute inflammatory process.

The doses necessary to bring about these good results are large, and must be frequently repeated at short intervals. Water forms a ready solvent for the salt, to which any aromatic addition, as tincture of cardimon, ginger, orange peel or extract of liquorice, may be made to mask its disagreeable taste, and to complete what is usually called

* Publicity in Baltimore was first given to the efficacy of Salicylate of Sodium in iritic diseases, by Dr. Wm. J. McDonnell at that time one of the medical staff of the Hospital, in an article read before the State Medical Society of Maryland in April 1879, and published in the society transactions for that year.

by dispensing druggists an elegant preparation. For hospital work the dose is 20 to 30 grains taken in a wineglass of water, and repeated every three hours, making from 150 to 200 grains of the salicylate of sodium for the first 24 hours of treatment, to be continued until the desired effects are produced. Should the paroxysm show decided indications of yielding at the end of the first day, the intervals may be increased to four hours, then to three times a day, slowly tapering off until the remedy is no longer needed. At times the stomach is much irritated by these doses, and nausea, even to vomiting, is induced. The head will ring as if from full doses of quinine, and temporary deafness is a very common sequel of the liberal administration of this drug. Some of my patients have complained of cerebral excitement, and even of hallucination, not always in a pleasant form. All of these disagreeable symptoms have promptly disappeared when the remedy is discontinued, and do not always accompany its administration.

If decided benefit is not observed in 48 to 72 hours the salt is not likely to prove useful in the given case, and the stomach and head disturbances require a change of treatment. I have promptly checked recurrent attacks of specific iritis in a few days by the administration of the salicylate of sodium, which, under the usual treatment of mercury and the iodide of potash, would necessitate weeks of medication to bring about the same salutary results. With the salicylate treatment mydriatics, of course, cannot be omitted.

The following report of a case only recently under treatment, exhibits the controlling influences of salicylate of sodium more conspicuously than any other which has come under my observation.

Miss M., æt. 50, residing in Washington, D. C., was operated upon six years since by iridectomy for an acute attack (fulminans) of glaucoma in both eyes. Sight was rapidly reduced to shadows, and the pain was very severe. The operation gave speedy relief, and within two months they lad had resumed active work in a large school, to which she added extra hours of study in the preparation of school books. Six months of this

over eye-work brought on a second attack of glaucoma, which necessitated the removal of an additional piece of iris from each eye, until nearly one-quarter of the iritic septum was taken away. The extensive corneal wound with loss of so much iris have given her six years of comfort and good eye-sight. In the left eye, her best, in which she has very acute sight, although she reads brilliant with either eye, there has been a small cystoid cicatrix, with a little end of incarcerated iris. This little blister would frequently rupture, and by taking off tension from the anterior chamber would give comfort; in other respects it would cause a very disagreeable feeling of grit, and would often be surrounded by a blush in the sclera prior to rupture. For nearly four years this little annoyance has been going on. Frequently she would have the vesicle stuck by her family physican, and at times he was induced to apply to it a point of nitrate of silver.

Six weeks since this left eye suddenly became very painful, highly injected, with very blurred vision. The physician called to see her, leeched her temple freely, and expressed such anxiety as to the seriousness of the disease that she was induced to take the train the next day for Baltimore, so that 48 hours from the commencement of this present trouble she came under my observation. I found her with all the prominent symptoms of an acute attack of iritis. The eye was highly injected, with slight increase of tension, and was very painful. The large coloboma was muddy, but exhibited no tendency to contraction. The iris was quite greenish when contrasted with the blue iris of the right eye, and some pus was sharply defined at the lower portion of the anterior chamber. Vision was reduced to the counting of fingers at one foot from the eye, and a turbid vitreous rendered it impossible to make a fundus examination with the ophthalmoscope. As the increased tension was not very decided, and the symptoms of iritis were by far the most conspicuous, I had the artificial leech applied, and commenced at once the salicylate of sodium treatment in 25-grain doses, at intervals of 2½ hours. The administration was faithfully carried out during the night, and on the next day, at the end of 24 hours, the appearances of the eye were markedly improved. All pus had disappeared from the chamber, and the conjunctival congestion was much paler. Pain had decidedly lessened, and the patient had a very comfortable eye, but she complained much of the effects of the remedy upon

stomach and head. She was deaf, buzzing and nauseated, and complained of queer feelings. Notwithstanding her discomfort I urged her, for the sake of saving her eye, to continue with the remedy for another day in increased intervals of from three to four hours. At the expiration of 48 hours the improvement could not be questioned. The iris had regained its blue color, and the pupil had lost much of its muddy look. She could count fingers much further off, but could not yet distinguish beyond number xx of Jäger's test type. All pain had gone, and much of the redness with it. She now complained so much of the disagreeable effects of the salicylate, and specially the hallucination of frightful faces jeering at her, that I was compelled to substitute for this salt the iod. potash. Convalescence had been, however, already well established, and the improvement in vision was so marked from day to day that she returned to her school work within a fortnight. She finally regained the perfect use of her eyes, reading easily the No. 1 of Jäger with the cylinder glasses, which correct the traumatic astigmatism sequel of the extensive corneal incision of six years ago.

ON A SMALL SERIES OF CATARACT EXTRACTIONS AND OTHER OPERATIONS ON THE EYE, MADE UNDER MOST UNFAVORABLE HYGIENIC CONDITIONS.

By CHARLES J. KIPP, M. D., Newark, N. J.

SOME time ago I was compelled, by reasons which I need not mention here, to make the below described operations under the following circumstances: The room in which the operations were made, and in which the patients remained during the entire treatment, was situated in the fourth story of an overcrowded and imperfectly ventilated hospital. All the wards in this building are small, and have windows on one side only, except the corner rooms, which have windows on two sides. All the rooms on a floor open on a moderately broad corridor running through the middle of the story, and the channels of communication between the different stories are a lift situated in about the centre the building, and two staircases, one at each end of the corridors.

The second and third floors were filled with sick and wounded, and amongst the latter were numerous cases of suppurating wounds, in none of which the so-called antiseptic method of treatment was employed. The average number of patients on the fourth floor, including the eye cases, was forty-nine, each of which had about eleven square metres (thirty-six cubic feet) of floor space, and one hundred and twenty cubic metres (nearly four hundred cubic feet) of air space. On the same floor, in a room next to the eye ward, were several old women afflicted with incontinence of urine,

whose presence could always be recognized, even at some distance, by the pungent ammoniacal odor of their garments, and in the corridor, at no great distance from my patients, there dwelt an old man suffering from cancer of the anus and of the nose, the stench from which was so intolerable as to preclude his admission into any of the rooms. The air on this floor was furthermore contaminated by two water-closets, which were without windows or other means of ventilation. Although carbolic acid and other disinfectants were used here in large quantities, the odor from them was at times, especially during damp weather, absolutely sickening, and depended, as subsequent investigation showed, on the presence of decomposing excreta in the casing around the wastepipes.

The air which surrounded my patients was thus polluted by the exhalations from the skin and lungs of a large number of persons, by the discharge from suppurating wounds and foul ulcers, and by decomposing excreta. Whether or not bacteria or other living organisms were present in this atmosphere I am unable to say, but it seems very probable that they were there in large numbers, since the conditions described are supposed to be highly favorable for their growth and development.

The operations made under these circumstances were ten cataract extractions, and several iridectomies, enucleations, and strabismus operations, in none of which the antiseptic method was employed. Although the patients on whom these operations were performed were not very cleanly, I took no particular pains to wash the eye or the parts about it before the operation. The instruments used were wiped off with a clean linen cloth before the operation, and after use they were cleansed with hot water. For the purpose of removing blood from the eye during and after the operation, I used *new* sponges and ordinary hydrant water. The dressings used were picked lint and a flannel roller, both of which were kept in a closet in the corridor, and were therefore exposed to the same air as the patients. Five or six hours after cataract operations the eye was examined and the dressings changed, and this procedure was repeated two or three times daily for the first five or six days.

In eight of the ten cataract extractions the operation was perfectly smooth and without any accident, but in several of these considerable time was spent in the removal of remnants of cortical substance. In the ninth case the lens in its capsule, containing also a foreign body, presented in the section immediately after the incision of the iris, and was followed by a quantity of fluid vitreous. In the tenth the lens was dislocated during the attempt to incise the thickened capsule. Fluid vitreous escaped in considerable quantity, and the lens was removed by a broad spoon. The capsule remained in the eye.

In all of these cases the section healed by first intention, and the healing process was accompanied by anomalous reaction only in the tenth case, in which a simple iritis developed. The visual result was above V. $\frac{6}{30}$ in all cases except the tenth, who can count fingers at about four metres. In this case thickened capsule obstructs the pupil, and the sight can doubtless be improved by another operation.

In this connection it may not be uninteresting to state that one of these patients had an attack of acute inflammatory rheumatism a few days after the operation, while still in bed, and that during this attack several hemorrhages occurred in the anterior chamber without producing noticeable reaction. The blood was slowly absorbed. In another patient, a hard drinker, a violent attack of gout in the left great toe came on on the fourth day, and passed off after some days without causing the slightest trouble to the eye.

With regard to the iridectomies and other operations, I need only state that the healing process was not accompanied by any unusual features.

From the experience here recorded it is apparent that the impure air of hospitals has little or no evil influence on the healing process after operations on the eye, and this being granted, it follows that the various antiseptic methods devised for the purpose of destroying the impurities contained in the air in the vicinity of the eye during and after operations on this organ, are at least of questionable utility.

In conclusion I desire to state that the sanitary condition of the building described has been vastly improved, through the liberality of a member of our profession.

A CASE OF GLIOMA RETINÆ, WITH SOME NOTEWORTHY FEATURES.

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IN reviewing the literature of glioma retinæ as compiled by Hirschberg, in his monograph on this subject, up to 1869, and also the continuation of the same by Volger for the next ten years (*Archives of Ophthal.*, vol. viii, page 374), there seems to be almost every conceivable variety of this morbid process before the profession. Nevertheless a case recently operated on by Dr. H. Knapp in his clinic presented several interesting peculiarities easy of demonstration, which seem to deserve being placed on record.

The history of the case is the following:

M. B., æt. 9 years, came to the clinic about three months ago, the eye showing the characteristic gliomatous reflex from the fundus. Absence of all pain and inflammatory symptoms. (Has had sore hands up to a few weeks ago.) Pupil of medium size and immovable. The yellow reflex in the vitreous appeared to be near the lens.

The enucleated eye was kindly given to me for examination.

Before I give the results of the examination I would like to call attention to a point in the method of operating practiced by Dr. Knapp, the advantage of which was particularly illustrated in this case.

It is a well known fact that, although cases of glioma may go almost to any extent without implicating the optic

nerve in any way, nevertheless, the great tendency is toward transmission along this tract to the brain, which transmission may take place at any stage of the disease.

Having this fact well in mind, viz., that it is sometimes the misfortune of the operator in the removal of the globe to find the optic nerve discolored, showing its implication in the morbid condition; and also remembering that the life of the patient depends upon the extent of this implication, and the question whether or not it can be completely removed, it is sometimes necessary to cut the stump of the nerve again after the globe has been enucleated.

Every operator is well acquainted with the difficulty of catching the end of the cut nerve after it has once retracted toward the apex of the orbit. To obviate this difficulty Dr. Knapp made use of the following device, viz.: he has had a pair of Langenbeck's ligating forceps bent so as to suit the curvature of the posterior portion of the eye, and before dividing the nerve these forceps are passed through the opening in the capsule of Tenon and the opticus is fixed at a point some millimeters from its entrance into the eye. The operation of enucleation then goes on in the usual way, the nerve being cut between the forceps and the eyeball. If the nerve-section proves normal the forceps are, of course, released and their office has been a superfluous one; but if, on the contrary, the nerve be diseased, as in our case, then the operator is master of the situation and without any further trouble he can cut the nerve again as far back as he desires, since he has the stump fast in the forceps.

The instrument does not offer any obstruction to the operating field; being once clasped it remains so until it is removed.

In this particular case the application was a very happy one, since after the nerve had been fixed and the section made between the globe and the forceps, the section of the opticus gave distinctly the appearance of a diseased nerve, whereupon a further exsection of the stump remaining in the orbit was demanded. Drawing the nerve forward and passing the scissors behind the forceps up to the very apex of the orbit, Dr. Knapp cut out about 12–15 *mm.* of the remainder of the nerve and had the satisfaction of finding the new cut surface of the nerve normal in every respect.

This gave great satisfaction to all concerned, since the operation demonstrated the beauty of the instrument, gave the patient a good chance for his life, and furnished a fine specimen for examination, as within the forceps there remained a section of the opticus gliomatously infiltrated on the one end and perfectly normal on the other, inviting a careful study of the exact manner of transmission of the process to the brain.

The nerve itself was thickened to about twice its usual dimensions, near the point of entrance into the globe, and the morbid condition was manifest up to the entrance of the central artery. Just here there was a very slight constriction which made it appear as if the nerve trunk was a trifle smaller than normal, while beyond the entrance of the artery the specimen seemed normal, having the dimensions and color of a healthy nerve.

The whole globe presented nothing unusual in its external aspect, with the exception of a somewhat shallower anterior chamber.

On opening the eye to admit of Müller's fluid, a yellowish mass exuded, which was examined under the microscope and found to contain quite a variety of round and spindle-shaped cells. Some of the retinal epithelium was also found under the glass. It presented a remarkably normal appearance, each individual cell having its usual shape. The tops of the cells were perfectly free from pigment and the nuclei plainly visible, the greater part of the brown pigment being below the nuclei and in the offshoots of the cells. The round cells resembled the granules of the retina, of course, but there were others that might have had an entirely different origin as far as the fresh condition was concerned. The cells were all free and floated in a thin granular mass.

When the eye had been properly hardened in Müller's fluid and alcohol, a section was made through the centre. On *macroscopic* examination the centre of the globe was found to be filled with a yellowish soft substance, which was interspersed with harder masses of a grayish color. Near the position of the retina there was a shell of grayish tissue which was in apposition with the choroid. This shell

extended around the entire fundus with the exception of one part about four millimetres from the papilla where the retina seemed to have been detached, the grayish shell leaving the choroid, and becoming much thinner at this place.

The lens was pushed forward, and the anterior chamber shallow. The iris and ciliary body seemed to be normal, as indeed the microscopic examination afterward showed them to be.

In making sections for the microscope, I first tried that particular part which I have before mentioned as presenting an appearance as if the retina had been detached. Under the instrument a better illustration of the origin of the tumor could not have been given. While the retina was detached the rods and cones, which were somewhat degenerated, were still in connection with it, whereas the pigment cells were degenerated. First, there came a portion of retina which was entirely normal, except that the rods and cones were disfigured by the tumor or by the hardening process. At a small distance from this the internal granular layer was thickened, and the pseudoplasm extended both *outward* and *inward*. The layer of ganglion cells was displaced by the round glioma cells which infiltrated also the layer of optic nerve fibres. In this place and here only did the pseudoplasm grow outward so as to encroach upon the choroid.

At other portions the outlines of the retina were not to be seen, but a very peculiar condition presented itself, viz.: the sclera, choroid and retinal epithelium were perfectly normal, and all the connective tissue between the external limitans and the epithelium was present, in the shape of numerous delicate bands which ran between these two layers. The remains of the rods and cones were present but atrophied.

Some of the specimens were studied without the aid of coloring materials, and in these, as well as in the colored specimens, I could clearly distinguish two different conditions: first, next to the limitans externa, there was a layer of round cells with large nuclei which seemed to be

the slightly hypertrophied *external granular* layer. These cells were embedded in an intercellular substance which was distinctly fibrous; and running perpendicular to the layer was also a system of fibres holding exactly the same relative position as the supporting fibres of Müller. The *external* limitans was intact.

Internal to this layer of round cells, comes a second accumulation which also has all the characteristics of glioma cells. They are imbedded in an intercellular substance which is only slightly fibrous, but distinctly granular. At regular intervals, columns of the first mentioned cells pass through the layer of the second, and expand over their inner border. The two layers mingle together nearer the periphery of the growth.

These two kinds of cells when colored with hæmatoxylin, imbibe the coloring matter to different degrees, for while the external ones are tinted a very dark blue, the internal are colored much less deeply, the difference being so distinct, that any two of them isolated could be distinguished at a glance.

In what this difference consists I do not pretend to say, unless there are two processes going on in the eye, one from the *internal* layer of granules which is the older, and a second development from the external which is of a more recent origin.

I would call attention to one fact however, viz.: where this dark shell occurs, which appears to be almost the entire extent of the fundus, there does not seem to be the least tendency to grow outward, as is demonstrated by the normal curvature of the external limitans and also the delicate tissue which passes from this layer to the epithelium without being crushed or crowded in any way.

Of course the whole growth was interspersed with blood-vessels of varying size, except the shell of dark cells, where not even a capillary was to be found.

Of particular interest is the study of the *optic nerve*, and especially since the piece of which we have already spoken, gives one end gliomatous and the other normal. The sheaths were much thickened, as if they were undergoing

some inflammatory change, but I could detect no implication of the nature of the tumor.

On examining a cross-section of the nerve the appearance of the figure depended entirely upon the location of the cut. Near the lamina cribrosa the whole tract was infiltrated with round cells, every one of which was colored the same dark blue as were those of the external layer of the tumor which we have already mentioned.

These cells do not follow the perivascular lymph tracts, as in the case described by Hirschberg (V. Gr'fe's Arch. XIV. 2, 47-55), nor does the process pass along the nerve in the manner set forth by Horner and Rindfleisch (Zehender's *Klinische Monatsblätter für Augenh.*, 1863), viz., that small round cells are migrating into the interstitial connective tissue of the optic nerve leaving between the clusters of glioma cells, clear spaces which represent the remains of the bundles of nerve fibres. It does not agree with a case of Knapp, recorded in his book on intra-ocular tumors, where the transmission goes on by the vascular connective tissue between the bundles of nerve fibres.

Near the lamina cribrosa there was a more or less complete infiltration of the whole section of the nerve, but only the nerve, the sclera and choroid remaining intact at these places.

There were very small light tracts between the accumulations of round cells, but these were the tracts of connective tissue rather than the remains of the nerve bundles, as was plainly shown in the sections nearer to the normal portion of the nerve.

At about one millimeter from the outer fibres of the lamina cribrosa there appeared a thin strip of normal nerve next to the sheath pointed toward the globe, but becoming broader and broader as it passed away from it. At a distance of 6 *mm.* from the globe the division of normal and gliomatous tissue is about equal. As the tract of normal nerve increases in extent, it surrounds the gliomatous, but always next to the sheath. Thus at some distance from the globe the normal tissue has completely encircled the pathological, leaving only a kind of *circumscribed* cone of

round glioma cells sharply defined and projecting into the normal nerve tissue. The end of this cone is near the point where the arteria centralis enters the nerve.

The connective tissue tracts between the bundles of nerve fibres (perineurium) are always remarkably free from the cells, these being confined to the connective tissue of the nerve bundles themselves.

A cross-section of the nerve and glioma cone shows the bundles of nerves replaced by gliomatous tissue, and the nearer the section to the eye, the larger are the sections of the individual gliomatous bundles, thereby the whole section of the nerve is greater in all its dimensions.

The increase in size seems to take place by a transformation of the nerve bundles into glioma bundles, and by direct contact, the lymph tracts taking no part in the process. As the bundles first commence to enlarge they encroach upon the lymph tracts and almost close them. When the bundles have reached a certain size (in some cases in the section five or six times as great as a normal nerve bundle) the lymph space is again restored on account of the curvature of the glioma collections, and is sometimes larger than normal.

The vessels are so compressed that they are mere slits in sections, and the normal nerve is also so encroached upon that the individual bundles are all flat. The interstitial connective tissue is much compressed, but between the bundles of nerves can be still observed a more or less complete system of capillaries.

The end of the gliomatous cone terminates in the middle of a single bundle of nerve fibres without any complication of the connective tissue between this and the adjacent nerve bundles.

It must then be stated that the glioma is being transmitted along the optic nerve merely by virtue of its continuity with the retina and without the help of any intervening tissue.

I do not think it necessary to give any further details of this tumor, as its other characteristics are the same as the general type of glioma.

The principle points of interest in this particular case are then the following: First, the method of operating, especially the instrument used by Dr. Knapp. Secondly, it is a *glioma endophytum, i. e.* one which grows toward the centre of the eye. Thirdly, the transmission of the pseudoplasm along the optic nerve by virtue of the continuity of tissue, independent of the presence of any intervening tissue. Fourthly, there seem to be two centres, one the external and the other the internal granular layer of the retina. The cells near the external limitans are colored with hæmatoxylin much more deeply than the others (forming a regular layer or shell), and these dark colored cells alone are found in the gliomatous cone which is passing up the optic nerve toward the brain.

A REMARKABLE CASE OF INJURY OF BOTH EYEBALLS.

By Dr. E. L. HOLMES, of Chicago.

IN the *Chicago Medical Journal*, 1859, I reported the history of a case which briefly is as follows:

A laborer, 37 years of age, consulted me in August, 1859, with the statement that in the previous March he had been attacked at night in a distant city by a fellow-laborer, who seized with each hand the hair of his head and with the thumbs ruptured each globe.

He further stated that the treatment had been almost entirely confined to wet compresses, saline laxatives and mercurials. He was almost totally blind four months.

A casual inspection revealed no abnormal condition of the eyes except a slight redness of the conjunctiva and drooping of the lids. On raising the upper lids I discovered that about one-quarter of the right and one-sixth of the left iris—upper and inner portion—were absent. In the corresponding portion of the sclerotic border of both eyes was a long dark cicatrix, in which could be seen many pigment dots. Both corneæ were perfectly clear. Each iris seemed drawn so tense that trembling was impossible. The ophthalmoscope revealed the fact that neither lens was present. The fundus of the right eye could scarcely be distinguished on account of the cloudiness of the vitreous. Light from dark could only be distinguished with difficulty.

The fundus of the left eye presented no appreciable injury. With this eye the patient could see to walk alone in the streets and to perform some kinds of labor.

About three years after this I examined the eyes and found the vitreous perfectly clear. There was no detachment of the retina,

as was maintained by a specialist of considerable experience who was present at the time. The vision of this eye, which for a period had improved, was nearly extinct. Each iris was slightly tremulous. The left eye continued unchanged in appearance.

In August, 1876, this patient again sought my advice at the Eye and Ear Infirmary. I observed that nearly every trace of the iris had disappeared from the left eye. He stated that four years before while in the act of stooping in the dark, the eye struck the sharp top of a chair so forcibly as to rupture it. His physician informed him that the contents of the globe were almost entirely lost. He recovered, however, in about a month with but little if any injury to his vision.

The tension of each globe was normal. Behind the external border of the cornea was a narrow dark and quite ragged fringe. Below and behind the inferior border of the cornea was a small black body, which was probably a portion of the iris in a condition of atrophy. Some lines behind the cornea there were several nearly transparent filaments, extending across the anterior part of the globe from above downward.

On account of the lateness of the hour further examination was deferred till the next day. Unfortunately the patient did not return. For this reason nothing definite regarding the refraction of the eye or the effect of lenses can be reported.

AN UNUSUAL OPENING INTO THE LACHRYMAL SAC.

By Dr E. L. HOLMES, of Chicago.

Mr. A., 26 years of age, states that about three years ago a surgeon performed an operation on the right lower lid for epiphora. From the description I am unable to decide whether Stilling's or Bowman's operation was performed.

The canaliculus presents an open groove into the sac. Above the groove is a circular opening, somewhat more than three millimeters in diameter, which is constantly patent, and as clear cut as if a piece of integument and mucous membrane of the sac had been removed by a sharp trephine.

The lining membrane of the sac seems perfectly normal, resembling the healthy conjunctiva of the upper lid. The deformity is quite apparent, permitting one standing in front of the patient to look quite near the bottom of the sac. The patient states that there was little trouble following the operation.

Exposure causes the open sac to fill with tears, which flow down the cheek as before. The edge of the aperture is so exceedingly thin and unyielding that a plastic operation seems scarcely practicable.

CONTRIBUTION TO THE PATHOLOGY OF THE PRONTAL SINUSES.

By H. KNAPP.

THOUGH the graver diseases of the frontal sinuses have attracted the attention of physicians at all times, and a part of them, "the morbid dilatation of the frontal sinuses by the accumulation of liquids" received a most careful description, in 1871, by Dr. F. Steiner,* at the time assistant of Prof. Billroth, this field appears by no means exhausted. The affections of the frontal sinuses are so rare, that no one observer can obtain a sufficient knowledge of their various clinical features by his own experience, and further, they are so important that not only the oculist but also the surgeon, and as our first observation will show, even the physician should be fully conversant with their pathology. I will not enter into any general description of these diseases, but simply communicate two cases which recently fell under my observation and are certainly important enough to be read with interest.

CASE I.—*Orbital and cerebral abscesses, originating in the left frontal sinuses. Death. Autopsy.*

On March 24, 1880, Dr. J. Lewis Smith of this city, did me the honor of calling me in consultation in the case of Mrs. Fl., æt. 30. The lady had had three children, and lost the youngest some months previously, which bereavement had greatly depressed her spirits. For two years she used to suffer from attacks of headache which lasted from several hours to a whole day. The pain sometimes extended along the nose, though she had never shown any

* *Archiv für Klin. Chirurgie*, Vol. xiii, p. 144–211.

symptoms of nasal catarrh. The week before the consultation she had had great pain on the left side of her forehead and in the left orbit. On March 18th she had chills. The upper eyelid began to swell and the eyeball to protrude. When I saw her I found the *outer* half of the supra-orbital margin red, swollen, hard and painful to the touch. The swollen part was in close connection with the bone, below which it projected with a slightly uneven surface. The eye was moderately pushed forward and inward. The pupil responded to light, vision was unimpaired, and the ophthalmoscope discovered only a slight venous congestion of the retina and some circumpapillary œdema. Dr. Smith and myself left the diagnosis undecided between dacryo-adenitis and periorbitis, and ordered mercurial ointment to be rubbed into the skin surrounding the brow. The pain continued, the swelling increased, and when, two days later, I saw the patient again with Dr. Smith, the presence of a large abscess, pointing at the junction of the middle and outer thirds of the upper lid, about a centimetre below the brow, was manifest. I opened it and let out a large quantity of creamy pus. The patient felt relieved and apparently recovered rapidly. The wound discharged only for a few days, then closed, and the swelling and redness of the lid and the exophthalmus disappeared. Six days after the opening of the abscess she paid a visit to one of her neighbors. From that time she felt worse again, complaining principally of headache. She grew very feeble, vomited, and lay mostly in a stupor. Her pulse varied between 50 and 60. In this condition she was found by Dr. E. C. Seguin who had been called in consultation nine days after I had opened the abscess. He stated that the upper lid slightly drooped, that the internal rectus was paretic and that with the ophthalmoscope only congestion of the retina could be discovered. *He diagnosticated an abscess in the left frontal lobe of the brain.* Two days later the patient died.

The *autopsy* was made twenty-four hours after death, by Dr. Seguin; Dr. J. L. Lewis, Dr. J. R. Leaming and myself being present.

The skull-cap and meninges at the convexity showed nothing abnormal. The gyri of the left frontal lobe were flattened. The second convolution was dark-bluish in the centre and yellowish at the periphery, involving a circular area, 4 *cm.* in diameter. The basis of the frontal lobe cor-

responding to the part first described as far as it lay over the roof of the orbit, showed a similar discoloration and adhered to the dura mater in a round place, 1 *cm.* in diameter. In this place the dura was bluish with a scant yellowish (purulent) deposit. By careful probing no perforation of the dura could be discovered. This round spot of the dura lay upon an equally large necrosed patch at the anterior-inner part of the roof of the orbit.

The brain was preserved entire, and will be carefully investigated by Dr. Seguin, while the orbital and nasal portions of the specimen were kindly given to me for examination.

The whole roof of the orbit, with the exception of the supra-orbital margin, was chiseled off and the contents of the orbit, including the eyeball, were removed. The above-mentioned blackened patch in the horizontal process of the frontal bone showed a perforation through which a thin probe could be passed into a lateral expansion of the frontal sinus. These cavities were filled with thick pus, smelling as offensively as the breath of a patient suffering from ozæna. The bony surface of the roof of the orbit was denuded, white and rough, but not necrosed. There was no pus either on the wall or in any other part of the orbit, nor was there any on the cerebral surface of the bone, excepting a few flakes around the perforation and on the adjacent part of the dura. Beside the frontal sinus the adjacent ethmoid cells were also found filled with offensive pus. The upper anterior ethmoid cells were invested with a thickened mucous membrane. The nasal passages and the turbinated bones appeared normal. A communication between the ethmoid, frontal and orbital cavities could not be detected. The eyeball, optic nerve and the remaining soft parts of the orbit showed nothing abnormal.

The description of the cerebral abscess will be given by Dr. Seguin elsewhere later, but here some *remarks on the origin and extension of the disease* in the case under consideration seem to be appropriate. There is a number of cases of suppuration in the frontal sinuses on record. In

almost all of them the swelling resulting therefrom, and the pointing of the abscess or perforation of the skin, was in the *inner half of the upper lid*, mostly above the inner canthus, sometimes, according to Mackenzie,* beneath the middle of the superciliary arch. In the case under consideration the swelling was so marked under the outer part of the supra-orbital margin that it bore a great resemblance to acute inflammation of the lachrymal gland, of which disease I have seen a few cases.

The autopsy showed that the frontal sinus had extended laterally so as to separate the cranial from the orbital plate of the horizontal part of the frontal bone. The flat cavity produced in this way, had a height of from 4 *mm.* to 6 *mm.* at the inner-upper corner of the orbit, and reached, gradually decreasing, as far as the junction of the middle and outer thirds. The orbital plate was brittle, and broken when removed from the cadaver, so that the perforation through which the pus had escaped from the sinus into the orbit, could not be demonstrated, but judging from the place where the swelling first appeared and the abscess pointed, I have no doubt that the perforation of the bone occurred at or near the temporal end of the extension of the frontal sinus. As such an extension of the frontal pneumatic cavity through the diploëtic substance of the roof of the orbit occurs frequently enough, we should not fail to seek for a remote cause in cases of caries of the supra-orbital margin. The above case at once suggests the idea that pent-up pus in the ethmoid frontal cells may be the origin of some of them. I do not think of explaining in this way the frequency of caries of the upper orbital margin in children, since the frontal sinuses, according to Dursy and Steiner, develop only between the sixth and eighth years.

That in our case there had been an inflammation with retention of matter in the left frontal sinus, is clearly proved by the periodic attacks of headache starting from the inner part of the left brow. The narrow and irregular communication of the frontal sinus and anterior ethmoid cells with

* Treatise, 4th Edition, 1866, p. 56.

the middle nasal passage through the upper end of the infundibulum, must have been closed, since the patient did not suffer from nasal catarrh or ozæna.

The propagation of the disease into the orbit and brain was a perfect analogue of what we so frequently notice in retention of matter in the mastoid process. There also the narrow exit of the mastoid antrum into the tympanic cavity is closed, periodic inflammations ensue, occasionally an abscess emptying into the drum cavity or behind the ear gives temporary relief; at last, the patient dies, and an abscess is found in the brain substance, sometimes at a distance from the temporal bone. In the case under consideration the channel of the inflammation was exceedingly clear; it was the necrosed patch of bone at the cerebral plate of the horizontal process of the frontal bone and the adjacent, blackened and somewhat wrinkled dura mater through which the morbid product had made its way into the cerebral substance. The formation of the abscess and all its consequences I leave to the more competent hand of Dr. Seguin to describe.

CASE 2.—*Polypi and accumulation of pus in the right frontal sinus; orbital tumor; exophthalmus; operation; permanent recovery.*

Mr. A. St., of Boston, æt. 23 years, was kindly sent to me by one of my medical friends in Boston. The patient, an educated, healthy-looking man, stated that six years previously his right eye began to be pushed down, forward, and outward. The protrusion had gradually increased. A tumor was first felt in the upper-inner corner of the eye four years ago, and had since been growing slowly but steadily. At times the tumor and its surroundings would be painful, and the tumor temporarily larger. During the last three months the pain in the region of the tumor and the protrusion of the eyeball had been more pronounced than before. When he presented himself, I found the eyeball displaced forward, down and outward, its motion restricted up and inward. A round tumor, about the size of a walnut, occupied the upper-inner corner of the orbit. Its centre felt soft, its periphery hard, and in some places bony. It was immovably connected with the periosteum. The tumor throbbed when he pressed on it, but it did not increase

when he stooped. S. R. $\frac{20}{40}$, L. $\frac{20}{30}$; no diplopia. The interior o the globe was normal. Besides occasional headache, there were no cerebral symptoms present, nor was there any abnormity discoverable in the nasal passages or the molar antrum. My diagnosis was a periosteal sarcoma with osseous spicula and softened portions, a kind of tumor which I have several times observed on the roof of the orbit in young people, even in children.

The patient was admitted to the N. Y. Ophthalmic and Aural Institute, and operated on, February 9, 1878. A curved incision was made below the orbital margin from the middle of the lid to the roof of the nose. On cutting deeper, a large quantity of offensive pus was liberated from a cavity which, by probing, proved to be the dilated frontal sinus and the upper-anterior ethmoid cells. The thinned and defective bony orbital wall of the cavity was then broken down with a chisel and strong scissors, and fragments of bone were removed. On further exploring the abscess cavity with a probe and the little finger, a considerable amount of soft tissue was felt on its inner wall. It was extracted with a pair of polypus forceps, which was introduced many times until nothing of the soft and very vascular substance was left. This substance had all the appearances of mucous polypi, which diagnosis was afterward confirmed by microscopic examination. There was considerable bleeding from the cavity. After it was arrested, a part of the wound was united with sutures, and pledgets of lint were inserted through the part of the wound left open.

For a week there was moderate swelling of the lids, and copious purulent discharge from the wound which was washed out with water by means of a syringe three times daily. A drainage-tube was put in. The wound was covered with charpie and kept in position with a flannel roller. Afe w pieces of granulating tissue were removed from the depth of the cavity. The pain was very mild.

In the second week after the operation the eyeball receded markedly into its socket, the swelling of the lids diminished, the secretion from the cavity was less, and easily escaped when the patient bent his head down.

In the third week the discharge was more and more scant, the tube was left out at times, the wound was smaller, no polypoid masses could be discovered in its depth, and the patient was dismissed, March 8th, *i. e.*, three weeks after the operation. He was directed to wear a silver drainage-tube in the wound and syringe the cavity two or three times daily.

This he did for a time, then when the discharge was no more

than a drop of matter a day, he kept the aperture of the cavity open with a small piece of twisted charpie.

On October 2, 1878, he presented himself again. There was still some hard swelling of the parts in the region of the wound. The eye was somewhat lower than the other, but not protruding. When he was tired and after shutting his eyes, he saw double for a few seconds. The movements of the eye were undisturbed, its exterior and interior normal, and S. $\frac{20}{40}$, as before the operation. The cavity of the frontal sinus, explored with the probe, proved reduced in size, showing, however, smooth walls all around. The nasal passages were free, and there were no cerebral symptoms.

The patient was directed to let the wound close. This he did, and had no further trouble from his previous affection. About a year after the operation he presented himself again, cured; and since that time he has written me a few letters, stating that no trace of a relapse has appeared, and that he feels quite well.

Though accumulations of matter, serum and blood in the frontal sinuses have repeatedly been described, and different kinds of tumors have been found to invade these cavities from the nasal fossæ, the occurrence of primary formation of polypi in the frontal sinuses without any such formation in the nose, appears to be of the rarest occurrence. The correct diagnosis in the case under consideration was, therefore, almost an impossibility before the operation. And even after the defective bony shell of the tumor was broken into, I had no suspicion of the presence of polypi, which were detected only when, by probing, I wished to ascertain the extent of the abscess cavity, and the conditions of its walls. The frontal sinus and the anterior ethmoid cells must have been shut off from the nasal passages, since there was no discharge from the nose and no ozæna before or after the operation, and the liquid injected into the abscess cavity never entered the nose. The recovery of the patient is certainly very gratifying. If a fistulous opening had remained, or in case matter should collect again in the frontal sinus, the proper treatment would be to reëstablish the communication between the sinus and the middle nasal passage by breaking through the ethmoid cells and inserting a seton or tube for a sufficient length of time—several months—as W. Bowman and others have done.

CONTRIBUTION TO THE TREATMENT OF KERATOCONUS BY ESERINE.

By Dr. B. STEINHEIM, of Bielefeld.

Translated by Dr. J. Bettman, of New York.

Clinical Asst. at N. Y. Ophthalmic and Aural Institute.

(*With Plates iii. and iv.*)

In volume ii., No. 1, page 166, of these Archives, I reported the clinical history of a painter, who, since March, 1849, began to suffer from keratoconus, and whose left eye I had operated on in October, 1869, according to von Graefe's method. The result of that operation was demonstrated by two plates, which illustrate a point, a star, a circle and the crescent of the moon as seen by the patient before the operation, and the changes which had taken place after the final cicatrization. Before the operation Jaeger No. 4 could be read only at 3″, fingers could be dimly distinguished only at a distance of 2′; no improvement was noticeable on testing with glasses, and owing to a multitude of secondary dispersion images, objects lost their original shape and appeared monstrously distorted. Nevertheless the result was decidedly favorable, for after a lapse of eight weeks, fingers could be distinctly recognized at 7–8′ and with concave $4\frac{1}{2}$ at 18′; Jaeger No. 1 was read at 4″, No. 4 at 5″ and S.=$\frac{18}{200}$. This result has remained materially the same up to the present time, the corneal cicatrix being very slight and no recurrence of the conus recognizable.

No attention was paid at that time to the right eye, and

only during the present year the patient, for reasons which will be stated below, desired to have the same operation performed on the right eye also. The condition of this eye, according to the above-mentioned report, was as follows: "On a profile view an abruptly rising and rather acute cone was noticed, and the former observation that the portion of the cone-like prominence which was opposite the source of light appeared dark, as in a shadow, was plainly confirmed. The greyish, striated speck at the apex of the cone is surrounded by a diffuse opacity resulting from previous inflammations. Touched with a probe, the apex shows a greatly diminished resistance, giving the impression of a thin bladder. Holding the book on the side he could read Jaeger No. 3 only at $\frac{3}{4}''$, and the largest type not beyond $3''$. By strongly pressing the eye with the lids he could plainly see fingers at $2''$–$3''$; beyond this distance, however, polyopia and chromatopsia occurred. If the patient placed a finger of his right hand gently upon the upper lid and exerted a mild pressure upon a certain part of the globe, which he had found by experience, his vision was increased to $\frac{1}{2}$; everything seemed clear to him, the smallest and largest types were seen without dispersion images. With this vision the patient felt completely satisfied. On close observation of this experiment, at the moment of pressure, a change in the corneal curvature is visible, and a convexity approaching that of the normal cornea is detected between the narrowed palpebral fissure. The patient generally avails himself of this manœuvre when painting.

In March (of the present year) the patient, who is an intelligent and very self-observing gentleman, called on me again, and was quite unhappy about the altered condition of his right eye. According to his own statement his right eye had remained the same up to two weeks previously, and he had employed his accustomed experiment with advantage. His sight then began to fail, both with and without the experiment. Everything appeared blurred, and the diffuse light prevented him from recognizing objects.

On examination the eye was found perfectly free from irritation. The centre of the cornea was conically pointed and the former opacity was much more extensive. The apex was soft and bulging like a bladder, and on pressing upon the cone with the lower lid, it could be pushed aside in wrinkles. A peculiar condition arose on doing this, which reminded me of the appearances noticed in keratitis bullosa when we press upon the vesicle with the lower lid and produce a wrinkle in it. I considered these rapid alterations as due to a process of softening of the conical part of the cornea and its immediate surroundings, knowing full well that from a strictly scientific standpoint little was expressed by this designation in an anatomico-pathological sense. I had not the opportunity of making a more thorough examination of the changes which had occurred.

Some reports of observations in regard to the treatment of keratoconus with eserine, induced me to try this less radical mode of treatment, viz., eserine in combination with a pressure bandage, in preference to availing myself of an operative procedure.

To examine the condition of the interior of the eye, atropine was instilled. A moderate opacity of the vitreous was observed, besides a high degree of sclerectasia posterior, surrounding the entire papilla. This last change had already been noticed in former years.

The following statements and subjoined drawings are the personal observations of the painter during the period of treatment; they are only a small extract of a great number of observations, and a special explanation is superfluous. They certainly present a faithful picture of the changes which took place, while he was under the influence of the above treatment. It only remains to be remarked, that toward the end of the treatment the condition of the cornea had changed in so far, that the softened spot described above gradually flattened and finally was converted into a corneal scar, the consistency of which differed in no respect from an ordinary macula following an inflammatory process. It gradually diminished in circumference.

The flame of a candle, Fig. 1, Tab. iii, iv, during many

years appeared when held at a distance of 1½ *m.*, like Fig. 3.

It appeared at the beginning of March, after the rapid alteration of the cone, like Fig. 2.

After the instillation of atropine on March 21st, like Fig. 4.

On March 22d, a firm pressure bandage was applied.

Fig. 5. Picture of the candle, a week later.

Fig. 6. After 2 weeks.

Fig. 7. After 3 weeks.

April 12th, Eserine was instilled.

Fig. 8. Six hours following.

Fig. 9. The day after.

Eserine used every day.

Fig. 10. April 19th, six hours after the instillation.

Fig. 11. The following day.

Fig. 12. April 28th, six hour after the instillation.

Fig. 13. The following morning.

Fig. 14. On the sixth day.

Fig. 15. After the eleventh day.

These instillations, continued from the 8th to the 12th of May, produced the same results; six hours after each instillation the picture being similar to Fig. 12, and on the following day appearing like Fig. 13. After the cessation of the instillations, the image gradually grew in size until May 18th, when it assumed and retained the shape of Fig. 15.

Up to a distance of 10 *cm.* objects appeared sharp and without secondary images; how beyond this distance the secondary images formed and gradually increased, is illustrated on Pls. iii, iv.

Fig. 16. At a distance of 15 *cm.*

Fig. 17. " " 50 "

Fig. 15. " " 150 "

Fig. 18. " " 3 metres.

Fig. 24, 25, 26, Plates iii, iv, appeared to the eye prior to the disease, like Fig. 27, 28, 29.

Following the treatment at the same distance like Fig. 30, 31, 32.

At a distance of 50 *cm.* like Fig. 33, 34, 35.

Periscopic glasses correct:—3½ at a distance of 120 *cm.* perfectly.

At the end of May, Jaeger 3 was read at a distance of 4″, and words of Nos. 2 and 1.

On October 1st, Sn. 1 was read at 3″, Sn. 2 at 4″.

The result of the treatment is so striking, that it is superfluous to add any other recommendation for this combined method of treatment. Whether or not all cases of keratoconus will pursue such a fortunate course, remains to be decided by future trials.

REMOVAL OF A PIECE OF STEEL FROM THE VITREOUS. PRESERVATION OF EYEBALL AND GOOD PERCEPTION OF LIGHT.*

By J. S. PROUT, M.D.,

SURGEON TO THE BROOKLYN EYE AND EAR HOSPITAL, BROOKLYN, N. Y.

On March 14, 1876, M. B., æt. 24, a stone-mason, presented himself at my clinic at the Brooklyn Eye and Ear Hospital, with the statement that, on the preceding day a piece of steel from a chisel struck him in the right eye. The important subjective symptom was a small central scotoma; vision was reported "good," though not carefully tested; there was neither pain nor photophobia; slight circumcorneal injection was found. Oblique illumination showed a small opacity in the upper and inner quadrant of the cornea, behind which a small triangular perforation of the iris was visible. The ophthalmoscope revealed a line of opacity running through the lens and a broken line in the vitreous extending in a backward direction. Below the macula there was a small retinal hemorrhage with some surrounding œdema. The vitreous was slightly hazy. Careful search revealed the presence of the piece of steel in the vitreous close to the retina, near the equator, just outside the vertical meridian, and oscillating with the movements of the eyeball.

The gravity of the case was explained to the patient, and he assented at once to an operation for its removal, which was performed as he sat in the ophthalmoscopic room, and was greatly facilitated by the repeated use of the mirror.

An incision about 6 *mm.* long was made with a narrow knife and scissors about 5 *mm.* behind and parallel to the margin of the cornea, through which an attempt was made to seize the foreign

* Read before the N. Y. State Medical Society, at Albany, February 3, 1880.

body with iris forceps, but without success. Ophthalmoscopic examination then showed that the body had changed its place and was held by the vitreous just behind the pupil. A spoon was introduced causing some vitreous to escape and with it the piece of steel, which, lodging in the incision, was then easily removed.

As the lens had been wounded at the time of the injury, an attempt was made to remove it also but with only partial success. Two sutures were used to close the wound in the sclera, and the eye was dressed and the patient treated as after a cataract extraction. The reaction was moderate, and on March 25th, eleven days after the operation, he was discharged. The eye was then free from irritation, the pupil occluded by swollen lens-matter; V.=ability to recognize features at 60 *cm.* (2 feet).

On May 12, 1877, he came again to the hospital and was seen by one of my colleagues in my absence. The eye presented a somewhat shrunken appearance, tension was diminished (—T3), the line of the incision retracted, Vision=perception of light. An irritative condition of the other eye existed for which removal of the injured eyeball was advised but refused.*

Present condition—four years after the operation: The right eye is in good condition, its appearance is nearly normal, there is a slight discoloration of the iris, but not enough to attract the attention of casual observers. The anterior chamber is deep, the tension reduced, (—T1,) the scar of the corneal wound and the hole in the iris are still visible. Behind the pupil there is a white layer of slightly vascular new tissue, thick in the centre, through the thinned edges of which a faint red reflex, but no view of the fundus can be obtained. Vision=perception of light. He would not permit the use of atropia for the purpose of dilating the pupil. The indentation caused by the incision remains; the movements of the eyeball are free. The left eye gives no trouble whatever.

The piece of steel removed is elliptical in shape, and measures *about* 1 *mm.* in length, ½ *mm.* in width and ¼ *mm.* in thickness.

* Thus far this account has been condensed from notes kindly furnished me by Dr. H. G. Cornwell, then our House-Surgeon, now of Youngstown, Ohio.

ACUTE MYELITIS WITH DOUBLE OPTIC NEURITIS.

By HENRY D. NOYES, M.D., New York.

Mr. G. M. D., æt. 25, clerk, came to me on September 2, 1879, with the following history.

He had always had good health, not had syphilis, had smoked tobacco for eight years to excess. Sight had always been good.

In the early part of August preceding, had been annoyed by constipation for which he took purgative medicine. On August 19th, began to have trouble in micturition. The stream would flow in jets and was difficult to start. He had no stricture. He was soon obliged to resort to a catheter and continued its use for about ten days, when he recovered sufficient power over the bladder to empty it with considerable effort. He also noticed a slight numbness of the lower limbs and that he did not feel the coldness of his bath as much as usual. It was painful to cross his legs, and there were some prickling sensations in them.

At the time when these symptoms came, he also had impairment of sight in the right eye. He had no headache, no nausea, no phosphenes, no dizziness.

Examination of the eye. gave H.=2 D., V.=$\frac{20''}{100}$, and the visual field as shown by figure 1. The optic disk was swollen on the inner half and a little hyperæmic, while on the outer and lower side it was nearly of normal elevation. Vessels but little enlarged, and the aspect is that of neuritis descendens more than of choked disc.

In the other eye a less degree of swelling of the optic disk, and this confined to the inner half and notably less hyperæmia than in the right eye. This eye had H.= 2 D., V.= $\frac{20}{20}$, visual field normal.

September 6th.—A slight improvement has occured in the right visual field. The left field normal.

September 11th.—The opposite or left eye has now sustained a mutilation of the visual field, and the right has undergone changes, see Figs. 2 and 3. Patient observed this change to have occurred on the 8th, but it was not attended by any other symptoms. By ophthalmoscope the inner half of right optic disk is swollen, and vessels are tortuous while the outer half is pale and much less elevated. A similar condition appears in the left eye, the predominant swelling being on the inner half of the disc.

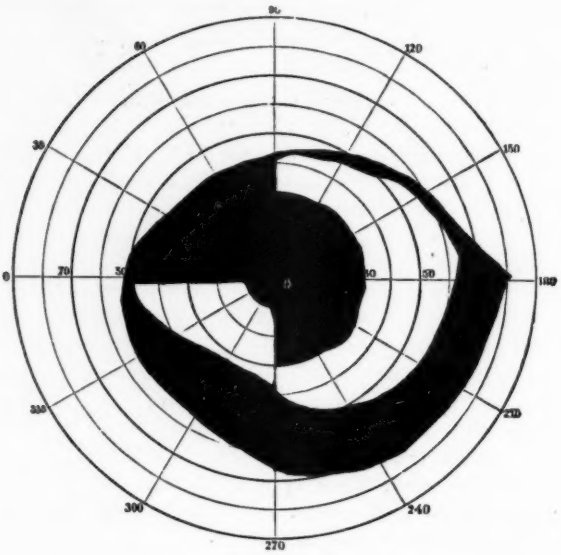

FIG. 1, O. D.

About a week ago the patient was examined at my request by Dr. T. A. McBride, who kindly gave the following notes. There is no disturbance of equilibrium, no ataxia, gait normal even with eyes shut, no paresis of lower extremities, by the dynamometer, the right hand shows 65, 63, 65 ; the left hand, 60, 56, 61. Patella tendon reflex present, more marked in right but not exaggerated, sole reflex deficient, some anæsthesia of lower extremities up to waist, marked on penis, scrotum and perineum. He had applica-

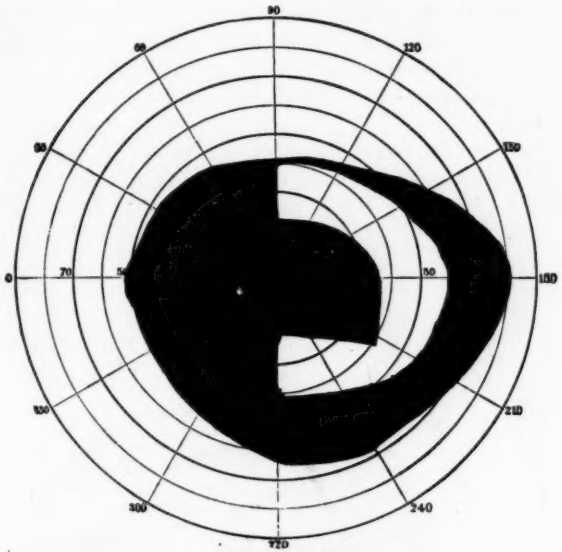

FIG. 2, O. D.

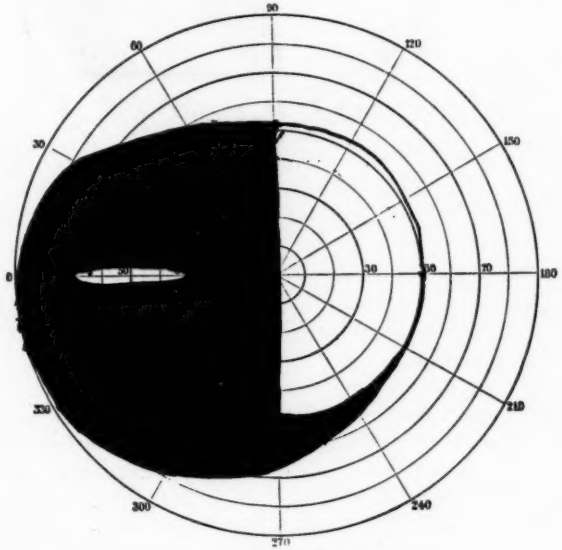

FIG. 3, O. S.

tions of actual cautery to the back of the neck, and began taking iodide of potassium, beginning with gr. x three times daily, and increasing the doses rapidly.

September 13th.—A little headache and some dizziness, see Fig 4, O. D.

September 16th.—Left visual field has become such as seen in Fig. 5, the right field was not taken. Sight very poor.

September 20th.—Fields have improved and sight is better, although it cannot be accurately measured. Both optic discs ex-

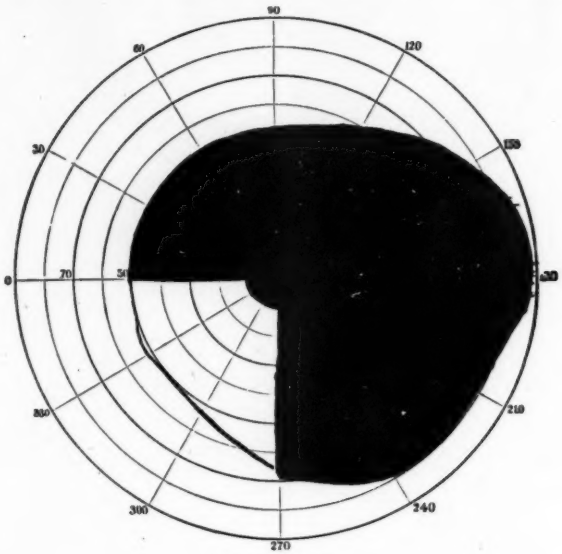

FIG. 4, O. D.

hibit partial swelling, but to less degree, while the remaining part of the disks are unusually pallid. Continues iod. potass. and takes 140 grains daily.

September 26th.—Now takes 220 grains iod. potass. daily. Decided improvement in sight and remarkable improvement in fields. Now has O. S., V.=$\frac{20}{40}$, O. D. $\frac{20}{200}$, see Fig. 6 and Fig. 7.

October 14th.—Is taking 300 grains iod. potass. daily. O. D., V.=$\frac{20}{200}$, O. S., V.=$\frac{20}{50}$. It is difficult to define the central scotomata but they are almost represented in Figs. 6 and 7, but fainter.

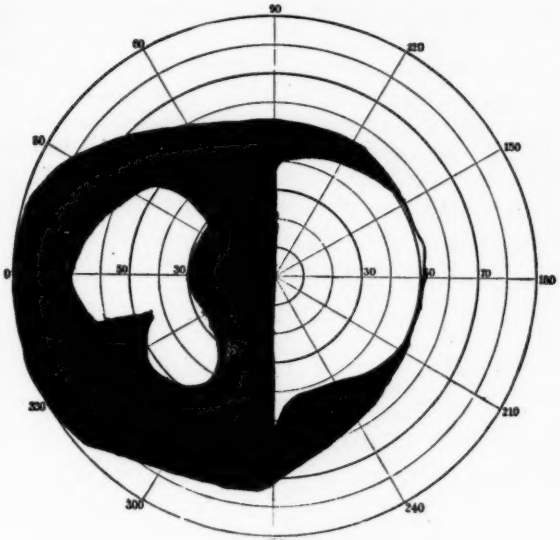

FIG. 5, O. S.

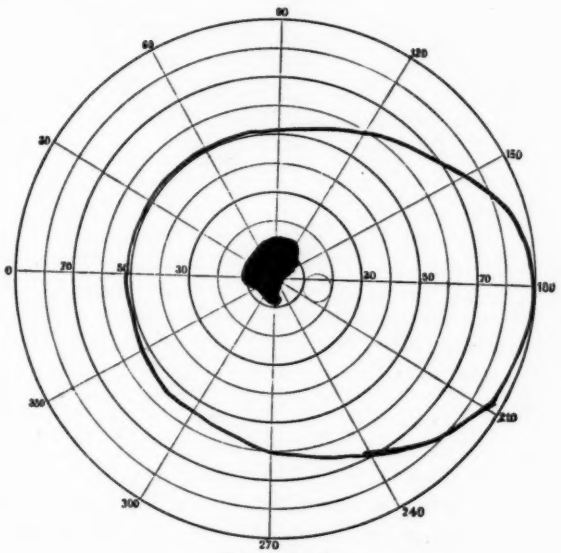

FIG. 6, O. D.

October 30th.—O. D., V. = $\frac{20}{30}$; O. S., V. = $\frac{20}{30}$ +. Stop iod. potass.

December 20th.—O. D., V. = $\frac{20}{20}$ and with + 48 = $\frac{20}{15}$. Fields perfect! has no deficiency in color-perception.

January 24, 1880.—Had headache during the last week, occurring morning and evening, and lasting for about two hours. No other head symptoms. Vision remains good. O. D., $\frac{20}{30}$. Optic nerves are pale, and suggest a slight degree of atrophy. Visual fields correct.

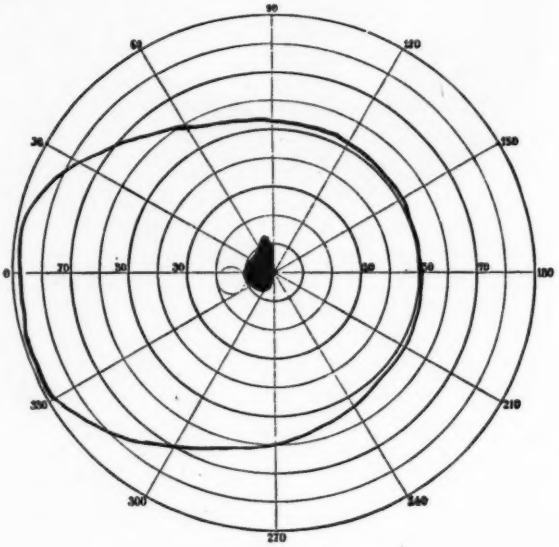

FIG. 7, O. S.

Micturition continues difficult; it requires an effort both to begin and to complete the act.

The urine was examined in the early part of the case and found to be normal.

Remarks.—This case falls in with the one which was reported by Steffan at the last Heidelberg Congress—see *Bericht über die 12te Versammlung*, 1879, p. 90, and seen also by Prof. Erb, and with another case observed by Dr. Se-

guin, which he relates in connection with the present one in the *Journal of Mental and Nervous Diseases.* Chicago, April, 1880, p. 177. The changes which have taken place in the visual fields are most remarkable. The immunity of one eye in the beginning, followed by an almost perfect hemianopsia of the left eye, while the right was three-quarters blind, was very noticeable. It must be pointed out that at this time the blind portion of the left field was not wholly obscured, as the figure shows, because a long and narrow cleft remained in which the eye could see. At a later time this cleft expanded into a large opening, while some encroachment took place on the periphery above and below of the remaining half of the field. In the other eye, the right, the field exhibits singular peculiarities both in its form and in its changes. Between September 16th and September 26th the dimness of both fields rapidly became reduced to a central small scotoma, which was found to be unchanged on October 14th.

October 30th.—Each eye, V. = $\frac{20}{30}$.

December 20th.—Each eye, V. = $\frac{20}{15}$, and scotomata entirely gone.

The ophthalmoscopic appearances were quite unlike the usual appearances of choked disk, and the more marked implication of each disk upon its inner side was distinctly and continuously recognized.

In this patient the symptoms of spinal cord inflammation were simultaneous with the eye trouble. They did not advance to an extreme degree, and they were never entirely absent.

A special interest attaches to the question of the localization of the trouble which disturbed the sight. Undoubtedly this must be placed within the cranium. It must also be carried back at least as far as the commissure, and in my judgment no satisfactory understanding of the strange succession of phenomena is compatible with a localization in the commissure. The inner halves of the optic disks were chiefly affected, and these refer us to the fasciculi cruciati of the commissure. So commingled are these fibres that it is inconceivable how such sharp definition and isolation

should take place in the mutilations of the visual fields, if the cause should be sought in the commissure. It seems to me that we must go back at least as far as the optic tracts before we shall reach a locality from which such singular symptoms may be conceived to proceed. If we attempt to go further back in the median line to the region of the anterior portion of the tubercula quadrigemina, I think other difficulties present themselves which make this region unlikely to be the seat of the disease. At best we can only speculate, and doubtless cases of a similar kind will ere long be brought to notice in which some clue may help our inquiries until an autopsy shall reveal the actual facts.

What value should be ascribed to the large doses of iod. potass. in treatment, it may be difficult to assert, but the remedy was well tolerated.

TWO CASES OF REMOVAL OF FRAGMENTS OF IRON FROM THE VITREOUS, IN THE ONE WITH A SCLERAL FLAP-SECTION, IN THE OTHER WITH A MAGNET.—REMARKS.

By H. KNAPP.

IN my paper on the removal of foreign bodies from the interior of the eye, published in March, 1879 (these ARCHIVES, vol. vii, pp. 311. *et seq.*), I collected seventeen cases of extraction of foreign bodies from the vitreous, 14 from literature, and 3 from my own experience. Two previous cases of Hirschberg* escaped me, which I regret so much the more as they are followed by careful microscopical examinations.

The first was that of a girl, æt. 10, into whose vitreous a piece of a gun-cap had penetrated through the superior-outer edge of the cornea. A week later a white reflex from the depth of the eye. $-T_1$; S $\frac{1}{\infty}$. Three weeks later :—irritation passed, a broad posterior synechia, iris retracted, an opaque stripe running antero-posteriorly through the lens. On ophthalmoscopic examination the upper part of the background appeared red, the middle part bluish, the lower white. Tn. The vitreous cleared up. Seven weeks after the accident, "when the patient looked down, a square-shaped, red-shining splinter of copper was seen suspended in the the centre of the vitreous." S $\frac{6}{200}$. Gradually the foreign body was encapsuled, the lens opaque, and S reduced to $\frac{1}{\infty}$. Nine months after the accident the lens was extracted by a superior linear section, then the foreign body removed from the vitreous

* *Graefe's Arch.*, xxii, 3 pp., 148–162, 1876.

with grooved forceps, which had to be introduced six times. Irido-cyclitis dolens and phthitis bulbi followed, on account of which the globe was enucleated five weeks after the operation.

In the second case a piece of steel had perforated the sclera near the inner corneal margin. Lens capsule ruptured in upper part. Near and a little above the posterior pole of the lens, a small chip of iron is seen floating in the vitreous, suspended by some delicate threads. Two days after the accident, Dr. Hirschberg extracted the lens by an upper flap of 4‴ basis. Prolapse of vitreous followed. A thin (iron or steel?) point "curved like a branch of iris forceps and attached to a horse-shoe magnet, around which the electric wire was coiled", was introduced.* but failed to attract the foreign body. The instrument was devised by Dr. Brecht.

As neither gentle rubbing nor bending the head forward brought the foreign body to view, the eye was provisionally bandaged, the patient lying on his back. When, several minutes later, the bandage was taken off, the foreign body appeared as a shining point behind the upper edge of the pupil, and was easily removed with forceps. Purulent irido-cyclitis dolens followed, and the eyeball was enucleated four weeks later.

After these two unfortunate cases, Hirschberg had a brilliantly successful one, which he described in the above-mentioned number (46) of the *Berl. Klin. Woch.* reprinted in his *Centralblatt*, December, 1879, and mentioned by Dr. Wolfe in his paper on traumatic cataract in *Brit. Med. Jour.*, Feb. 14, 1880, where (page 234) a wood engraving of the electro-magnet used, is given. The history of the case, abridged, is as follows:

A piece of steel, sprung from a hammer, entered the eye of a 16 years old blacksmith. He traveled 6½ hours. 1½ *mm.* behind the superior edge of the cornea, was a horizontal scleral wound, 2½ *mm.* in length, kept gaping by a bead of clear vitreous. The eye was bandaged, and the patient directed to

* *Berliner Klin. Wochenschr.*, No. 46, p. 684, Nov. 17, 1879, and *Graefe's Arch.*, xxii, 3, p. 157, 1816.

lie in bed quiet for several hours. In the evening of the same day a piece of iron was distinctly recognized in the lower part of the vitreous. The next morning, the foreign body still being seen in the same position, Dr. Hirschberg made with a Graefe's knife a meridional incision of 4 *mm.* in length, beginning at the posterior end of the ciliary region. The foreign body did not escape by gentle pressure on the globe nor by the first introduction of a curved thin point attached to an electro-magnet. The wound was then posteriorly enlarged with squint scissors to a length of from 7 to 8 *mm.*, the end of the magnet introduced again, advanced further toward the lower part of the vitreous, a click was heard, and on being withdrawn the magnet brought out a black splinter of iron. The conjunctiva over the wound was closed by two sutures. Recovery without irritation. The places of the entrance of the foreign body and of the operation show, on opthalmoscopic examination, the well-known white patches, *i.e.*, defects in the choroid. Five weeks after the operation the patient was presented to the Berlin Medical Society, the eye cured, having a defect in the upper-inner part of the field of vision corresponding to the wound of the operation. He could read finest type (Sn 1½ at 9″) with the injured eye. This complete recovery has proved permanent, as Dr. Hirschberg mentioned in a letter to me some weeks ago.

There is another recent and no less successful case, of removal of a piece of iron from the vitreous with a magnet on record, published in Hirschberg's *Centralblatt*, February, 1880, p. 37 *et seq.*, by Dr. G. Fränkel, of Chemnitz.

A machinist, æt. 17, in chiseling iron, was struck by a particle at the lower-outer sclero-corneal junction. The wound was 6 *mm.* long, filled with iris, which Dr. F. cut off. Lens uninjured. No foreign body was detected, blood occupying the lower part of the vitreous. A contraction in the upper part of the visual field, detachment of the retina in the lower part of the eye, and opacities of the vitreous were noted in the next week. A powerful permanent magnet passed along the outside of the sclerotic, did not produce any movement of the supposed foreign body within the eye, but 24 days after the injury, one day after the trial with the magnet, Dr. Fränkel distinctly saw a large splinter of iron lying loose on the lower part of the retina. Dr. F. then opened the

sclerotic between the inferior and outer recti by a meridional incision 10 *mm.* in length. The foreign body did not escape, nor was it to be felt with a pair of forceps carefully introduced. The wound was then made somewhat gaping, and the edge of the magnet passed along it from in front backward. When the magnet approached the posterior corner of the wound, the foreign body at once firmly attached itself to it. Very little vitreous was lost. Recovery undisturbed. Thirty-seven days after the operation there was no detachment of the retina, but striped opacities of the vitreous covered the anterior part of the scar left from the operation. S $\frac{6}{18}$. The scleral wound was marked by a slight depression. Dr. Fränkel concludes his report: "I have used Janin's magnet (bands of steel bent in form of a horseshoe, and united at the poles by steel caps), of course only since I had no other at hand that was suited for this special case. An electro-magnet (Hirschberg's) probably would have answered best. A magnet which can be introduced into the wound offers, no doubt, still greater chances of success." The foreign body was a chip of iron, 6 *mm.* in length, with a very sharp edge. It weighed 4 cgrm.

Besides these four cases, I can refer to one, "a piece of steel in the vitreous," published by Dr. C. S. Bull in the previous number (p. 79), and to another by Dr. J. S. Prout, published in the present number, (p. 197) of this volume.

In the former, a foreign body was felt with a probe lying close to the scleral wound, still open thirty days after the accident. It was extracted with forceps Oct. 8, 1879. Recovery. Sight—weak before the injury,—$\frac{2}{10}$.

In the latter, the chip of iron passed through the cornea, iris and lens. It escaped with a bead of vitreous after the introduction of a curette. Moderate shrinkage of the globe followed.

To these six cases I can add two of my recent practice.

CASE I.—*Extraction of a splinter of steel by a scleral flap section, after having lain in the ciliary body seven months, producing chronic uveitis. No irritation from the operation. Shrinkage of the globe. Optico-ciliary neurectomy.*

Mr. J. C. B., æt. 21, of Berlin, Can., came to me March 1, 1880. Seven months previously a piece of steel, flying off from

a hammer, entered his right eye. It produced very little reaction. At first he saw dark spots floating about; during the last months a general fog, varying in density at different times, was spread before the eye. I found his vision $\frac{20}{100}$, F contracted on the nasal side, and a scotoma near the point of fixation. Moderate circum-corneal injection. The pupil was medium-sized, horizontally oval, sluggish, insufficiently dilating on instillation of atropia. The iris was greenish-yellow, somewhat retracted. The other eye was normal, its iris bright blue, the pupil round and promptly responsive to light. S $\frac{20}{20}$. Interior normal. The right injured eyeball was free from pain, not tender on pressure, but its tension reduced ($-T_1$). In the external part of the fundus, just behind the limit of the ophthalmoscopic field of vision, a white patch of two papilla-diameters in length, ½ P. D. in breadth, indicated the place where the foreign body had entered the eye. The vitreous was cloudy from diffuse and floating opacities, yet the fundus could be seen. The optic disc was red, its outlines ill-defined. The surrounding retina slightly opaque (œdematous). The retinal veins were swollen, dark and tortuous. The choroid was more veiled in some places than in others, and partially denuded of pigment, which was collected in irregular clusters. There was no detachment of the retina. A defect in the nasal part of the field of vision corresponded to the scar in the temporal region of the eye. With oblique light a dark, but partially lustrous body was detected in the inner part of the ciliary body. Dark and gray dots and short lines, situated on its surface, trembled when the eye moved.

I admitted the patient to the N. Y. Ophthalmic and Aural Institute, having decided to attempt to remove the foreign body as soon as rest and anti-phlogistic treatment had produced an improvement in the inflammatory condition of the inner coats of the eye. This, however, did not take place; on the contrary, the opacity of the vitreous increased so that the papilla could no longer be distinguished, and S sank to $\frac{15}{200}$. Thinking that further delay would still aggravate the inflammation, I removed the foreign body, March 6, 1880, in the following way.

With a Beer's knife an incision was made, beginning about 4 *mm.* behind the corneal margin and extending along the lower edge of the internal rectus muscle almost to the equator of the globe. The end of a grooved hook, made of flexible iron—in shape exactly like the foreign body hook described in my paper

cited above—and attached to an electro-magnet, which was connected with a Stöhrer's battery, was introduced into the eye and advanced in different directions without any effect. It was withdrawn, bent and reintroduced so as to touch the inside of the ciliary body, but it did not bring out the piece of steel. After these attempts, the grooved hook was introduced and gently passed over the region of the foreign body, but it equally failed. I then used a pair of delicate forceps,without getting hold of the chip of iron. Very little loss of vitreous was connected with these manœuvres. After darkening the room I found, on examination with oblique light, the foreign body undisturbed in its previous position, about 2 *mm.* above the incision I had made. I then enlarged the wound with a pair of strabismus scissors by a curved incision running from its inner corner upward and slightly toward the cornea. The flap thus made was seized with iris forceps at its apex and raised so as to lay the interior of the eye open. The foreign body was at once seen, and being enveloped in semi-transparent soft connective tissue, was grasped with forceps and cut out together with the surrounding connective tissue. Only a drop or two of blood, but no vitreous escaped. The scleral wound was then united with two delicate silk sutures. The particle of steel measured 3 *mm.* in length. and 2 *mm.* in breadth.

No irritation followed the operation. The patient had no pain, the wound healed by first intention, there was some blood in the anterior chamber which disappeared in five days. The vitreous was cloudy; the patient had good perception of light. Four weeks after the operation he was discharged according to his own wish, and staid a week at the house of a relative. His eye had always been softer ($-T_1$), but was free from pain, not tender to the touch, and had almost lost its redness. When he returned, he could count fingers at a distance of 2′. His field of vision was defective on the temporal and nasal sides.

At the beginning of the sixth week, however, the circumcorneal injection was more pronounced again, the pupil contracted slowly in spite of the atropia, and sight was again reduced to $\frac{1}{\infty}$. The patient returned to the institute, was very carefully watched and treated, yet the eye remained soft, the pupil was below medium-size, a yellowish small patch lay on the anterior capsule, apparently in connection with the inner border of the pupil, which was adherent to the capsule. The cornea had some ver

tical stripes, and the eyeball grew smaller. The other eye was carefully watched, its pupil was free and movable, dilated well by atropia, the media and optic disc were examined every day, and never any abnormity was found. Yet the patient complained of the light, having long and sometimes unpleasant after-images, his eye and being not altogether comfortable. The other eye was soft, and shrunken, but not tender to the touch. It had only faint perceptions of light, and since the chronic uveitis which was present before the operation, had only temporarily been arrested, I considered this eye not only useless, but even dangerous. Of the two operations reported to avert danger, enucleation and neurectomy optico-ciliaris, I recommended the former in the first place, but the patient and his relatives decided for the latter.

I performed it in a most thorough manner on April 27, 1880, 52 days after the removal of the foreign body. The reaction from this operation was over in two weeks. The cornea was completely insensible in its whole area. There was no ulceration. The eyeball remained somewhat smaller than the other, squinted slightly inward and did not move outward at all, though the nerves had been exsected through an incision between the superior and inner recti muscles. The scar of the wound for the removal of the foreign body has become almost invisible. The patient returned to Canada May 21, 1880, feeling no discomfort from his injured eye, and the other was in a perfectly healthy condition, free from any kind of irritation.

CASE 2.—*Piece of Steel concealed in the Vitreous, producing acute Suppurative Irido-choroiditis. Removal with an Electro-Magnet.*

On the morning of May 19, 1880, Mr. A. K., machinist, æt. 30, of New York, came to my office, stating that five days previously, while striking one hammer with another, he felt that something hurt his left eye. Inflammation set in the second day, increased steadily and took away his sight. I found S $\frac{1}{\infty}$; F complete; +T ?; pronounced episcleral injection with moderate chemosis, hypopyon of 3 *mm.* in height; the pupil somewhat dilated with atropine, adherent at its inner part; the iris dirty-greenish. In the inner segment of the cornea, in the horizontal meridian, about midway between corneal centre and periphery, there was a small irregular opacity, from which a delicate cord passed directly back-

ward attaching itself to the inner part of the iris ; no perforation of the iris being visible. The lens seemed somewhat opaque near the inner equatorial region. The vitreous was not to be illuminated with the ophthalmoscope. Under oblique light its upper inner part looked intensely white in a round spot of an apparent diameter of about 4 *mm.*, resembling a pustule. The space adjacent to this spot above and toward the temple looked less white, and the remainder of the background dull whitish. Pressing on different points of the globe with the smooth rounded knob of a thin lead pencil, I found tenderness only in the upper ciliary region, most pronounced at a place corresponding to the pustule. Nothing could be detected of the foreign body

I told the patient that a piece of steel lodged in the depth of his eye, and there was but a slender chance of getting it out with a magnet. I should make the attempt, if he would give me discretionary power, in case I did not succeed, at once to remove his eye. He consented, went to the N. Y. Ophthalmic and Aural Institute, where I performed the operation in the afternoon of the same day. The above-mentioned pustule was less marked than in the morning, the vitreous more generally milky, the chemosis had increased, and the pupil was somewhat narrower.

From the local tenderness and pustule-like appearance of the upper-inner part of the background I inferred that the foreign body had for some days lodged there, but as this place was now no longer whiter and more tender than other parts, the foreign body might have followed the general rule and sunken to the bottom of the eye. If it lay there loose, the magnet would attract it ; if, however, it were still enclosed in pus in the upper part, it would scarcely be possible for the magnet to detach it, unless its point were directly stuck into the pustule. Having these two possibilities in mind, I attached a thin probe-like iron point to the electromagnet, and made with a Beers knife an incision of about 6 *mm.* between the inner and inferior recti. A large bead of somewhat streaky vitreous came out, but no foreign body. I introduced the end of the magnet into the vitreous, advanced it toward the median line and the posterior pole of the lens—no click ; I withdrew the magnet—no foreign body. I introduced the magnet again, passing it in every direction around the opening, and withdrew it —the same negative result. Then I introduced it a third time, passing the end of the probe-like point directly up where the pustule was, and touched the background there in different places.

No click, and the needle came out without the foreign body; but on looking at the wound immediately afterward, we all saw at once a well defined black body in a bead of vitreous projecting out of the wound. It was a chip of steel, about 2.5 *mm.* in length and 1.5 *mm.* in breadth.

The conjunctiva was tightly united over the scleral wound, and a compressive bandage applied. The patient had some pain in the first night, none since. The next day the lint was clean, but the upper lid and the conjunctiva were considerably swollen, as if panophthalmitis suppurativa had set in. The pupil, however, was larger, the cornea and anterior chamber were clear, and the hypo pyon had disappeared. The vitreous looked whitish. S $\frac{1}{\infty}$. No pain on pressure. The swelling of the lid subsided in a day, the conjunctiva, however, remained swollen for four days.

The pupil dilated, the lens showed a distinct opacity in its inner region through which the foreign body must have passed. There were floating white streaks in the vitreous. This was the condition May 25, 1880.

Remarks.—Though the time after the operation is still too short—six days—and the inflammatory symptoms have steadily abated from the second day after the operation, I fear that the suppuration had already reached too high a degree, when the foreign body was removed, to expect the recovery of useful sight. I trust, however, that the eye will preserve its shape and will not prove troublesome or dangerous.

Not being able to see the foreign body, but presuming that it was more or less surrounded by streaky, purulent vitreous, I wanted to employ as powerful a magnet as I could get. The instrument which I used in the previous case consisted of a bar of steel or, at least, of impure iron, around which a coil of isolated wire was placed. When I received it from the maker, it showed no attractive force, but as soon as I passed the electric current through the wire, it became a powerful magnet. Dr. E. Grüning has constructed for the particular purpose of extracting particles of iron or steel from the vitreous chamber, a permanent magnet according to the principle of a magnetic battery (a Couiomb's magazine), and in the *Medical Record*, May 1, 1880, described three forms of it. I selected the strongest of them, consisting of

six magnetized steel rods, fitting into iron caps, and provided with a flexible iron point 32 *mm.* long. In order to compare the strength of these instruments, I suspended an iron key by a silk thread on a wooden stand. The magnetized iron or steel bar of the previously used instrument attracted the key only at a distance of 2 *mm.*, very slowly, and almost without a click. Grüning's permanent electric battery which I had just bought at the factory, attracted the key four millimeters and with a distinct click. When I passed the electric current through the first instrument, the key was attracted from a distance of from five to six millimeters, more rapidly and with a louder click than by the permanent magnet. The electro-magnet thus proving the stronger, was deemed better suited for the extraction of the chips of steel than the permanent magnet. As a few cells are sufficient to develop the full power of electro-magnets, and an electric battery is in the possession of almost every physician, I think electro-magnets are not so very cumbersome instruments. Since it is of no importance for our particular purpose to have the electro-magnet lose its magnetism when the current is interrupted, its core need not be of pure soft iron. Impure iron or steel as in the above-mentioned instrument of Dr. Brecht, may even be preferable. Both are magnetized by the current, and retain a part of their magnetism, which, however, when the instrument has lain idle for a length of time, becomes too feeble to be made use of, as the experiment with the instrument in my possession has proved.

In my report of Dr. McKeown's first case, taken from Nagel's *Jahresbericht*, it is stated that the two rounded united ends of a horse-shoe magnet were introduced into the eye. This is, as Hirschberg (*l. c.*) says, a mistake. Only the one pointed end of a magnet is introduced, since it is impossible to introduce both.

The last of the two cases under consideration is very suggestive. 1. It would have been easy to extract the piece of steel with the magnet, if, during the first days, it had been seen. 2. It proves that the magnet is capable of extracting iron and steel from the vitreous, even when sup-

puration has set in and conceals the foreign body completely. The point of the magnet is then used as a probe. Where the foreign body was located, remains undecided. It may have been near the opening which I made into the coats of the eye, or at the bottom of the vitreous. There it may have been picked up by the magnet on the first or second trial, and stripped off at the edge of the wound. The fact, however, is that it was seen in the wound only when the magnetic probe, after touching the upper-inner, most inflamed region of the globe, was withdrawn. Thus it remains undecided, whether the magnet brought the piece of steel from above, or, after previously having drawn it near the wound, took it up again on its way out. 3. Probing of the vitreous being, however, by no means a harmless procedure, we should use all our sagacity and all the means at our command to determine both the presence and location of a piece of steel in the vitreous. The site of the centre of inflammation, as determined by the ophthalmoscope, oblique light and palpation; furthermore defects in the visual field, and our knowledge of the usual course which foreign bodies take in the vitreous chamber, may help us greatly, but it is again the magnet that promises to be our most important ally also in this determination. Powerful magnets have been passed, by Dixon and others, over the outer side of the sclerotic, by which manœuvre chips of steel, floating in the vitreous, have been moved and drawn to the wall. Far more important, however, appear to me the results of experiments which Dr. T. R. Pooley has, of late, been conducting in the laboratory of the N. Y. Ophthalmic and Aural Institute, and of which he has just handed me a preliminary communication to be published in the present number of these ARCHIVES, (see p. 219). These experiments were based on the principle that if a fixed magnet attracts a movable piece of steel, a fixed piece of steel must attract a moveable magnet. Simple and well-known as this principle is, it is strange that no one before Dr. Pooley has applied it to the eye, so much the more since it has been used with advantage in general surgery.

Concerning Case 1, the old experience that a foreign body

encapsuled and connected with the coats of the eye will not be moved by the magnet, is again exemplified. The method of cutting directly down to it, not by a mere linear incision, but by a scleral flap-section, seems to me worthy of note for future occasions. As this flap-section healed without any reaction, I do not see why in cases where we know that a foreign body is fixed in a certain place of the choroid or retina, or why in certain cases of subretinal cysticercus and similiar conditions, we should not avail ourselves of the case under consideration, as a precedent.

ON THE DETECTION OF THE PRESENCE AND LOCATION OF STEEL AND IRON FOREIGN BODIES IN THE EYE BY THE INDICATION OF A MAGNETIC NEEDLE.

By THOMAS R. POOLEY, of New York.

(Preliminary communication.)

FOR some time past I have been conducting a series of experiments for the purpose of determining the availability of magnetism in finding particles of steel and iron in the eye. These experiments have now been brought to a close. The results which they have given seem to me to possess great value by adding another method of physical examination to aid in deciding the presence and *location* of foreign bodies in the eye. It need hardly be added that if this object can be accomplished, the attempt to remove the foreign body is much more likely to succeed. The incision can then be made in the nearest route to it, and far less injury result from the operation than when haphazard explorations, or, at best, those given by less precise methods, are employed. As I purpose soon to publish a more elaborate account of these experiments, whose length would be too great for this number of the Archives, I beg to offer the following preliminary abstract.

The principle made use of in my investigations is not new, as it has been utilized in the detection of such foreign bodies elsewhere; *but so far as my knowledge of the subject goes, it has not hitherto been employed for their detection in the eye.* In the detailed reports of the experiments, I shall

give a resumé of the literature of the subject. I would only state at this time that the method used by me did not differ materially from its application elsewhere. This consists in the employment of a suspended magnetic needle which is held over or near the suspected part, when the presence of the foreign body will be indicated by the deflection of the needle. In the case of unmagnetized particles, these indications are not generally sufficient; but when the body itself is rendered magnetic, the value of the procedure is greatly enhanced. Moreover, the foreign body may just as well be rendered magnetic when embedded in the tissues of the body or in the eye. To accomplish this result there are two principal methods—first, by transmitting a galvanic current through the suspected part; second, by bringing an electro or a permanent magnet near it, thus rendering the foreign body magnetic by induction. The latter method was the one made use of in all of my experiments.

These experiments consisted of three series:

I.—To determine whether unmagnetized particles of iron or steel would exert sufficient influence on a magnetic needle to indicate with certainty their presence at distances sufficient to make such method available for their detection in the eye. Again, to determine the practicability of rendering such particles magnetic at such distances as to be able to take advantage of their increased effect on the magnetic needle for their detection in the eye. The results of these observations to be detailed in the forthcoming paper is such as to decide these propositions decidedly in the affirmative.

II.—Eleven experiments were conducted on the eyes of pigs and sheep, by introducing pieces of iron and steel of varying sizes, and then searching for their presence and location with the suspended magnet, both before and after they had been rendered magnetic. These results were then verified by making exploratory incisions or sections of the globes to ascertain the accuracy of the test, and in hardly an instance did it fail to give a precise indication.

III.—Three experiments were made upon the eyes of

living rabbits by introducing into them small pieces of steel wire through a canula, leaving them in the vitreous until suppurative choroiditis ensued, and testing for their presence as before. In each instance very accurate indications were obtained, and in all the foreign body was found where indicated.

Finally, through the courtesy of Dr. Knapp, an opportunity was afforded to test the value of the method on a patient who had a foreign body in the vitreous. This case will be found described in this number of the ARCHIVES, and I need only state, therefore, that the magnetic indications of the presence and position of the foreign body, as observed by myself and two others, were very decided. Its successful removal, the incision to accomplish which Dr. Knapp, for other reasons, made at this point, in my judgment demonstrate the practical value of the method.

In such a short communication as this it is necessary to confine ourselves to a mere statement of the facts observed. I shall fully describe all details of the method used in my experiments, and the result obtained in each of them, in the next number of these ARCHIVES.

FURTHER OBSERVATIONS ON OPTICO-CILIARY NEUROTOMY AND NEURECTOMY.

By H. KNAPP.

SINCE the publication of my paper on the division of the optic in ciliary nerves in the previous number of these ARCHIVES (p. 91, *et seq.*), a number of facts have come to light which deserve due consideration. The case of Mauthner-Jæger, in which the optic nerve, previously divided, was found to be re-united, has been prominently brought forward in the discussion of this new operation; further, a number of cases have been reported by Schöler and others in which the sensibility of the cornea was sooner or later partially or totally restored. Schöler, who during the year 1879, performed the operation 16 times—on the whole at present about 50 times (See *Berl. Klin. Woch.*, May 10, 1880. p. 277) mentions a case in his *Jahresbericht für* 1879, p. 5 in which he performed neurotomy for a recent injury. After the recovery from the neurotomy the other eye showed pericorneal injection, lachrymation and photophobia, on account of which S. enucleated the injured eye.

Hirschberg (*Berl. Klin. Woch.*, May 3, 1880,) relates a case in which a prominent oculist had made two successive neurotomies for an iron splinter lodged in the eye, but within a year the eye had again become painful and tender to the touch in the ciliary region, making its enucleation necessary (the case, with remarks on optico-ciliary neurotomy, already published in the German edition, will appear in full in the next number of these ARCHIVES).

In the last number of the *Annal. d'Ocul.*, Mars-Avril, 1880, p. 169 *et seq.*, several unfortunate consequences of the operation are reported.

In one (Santarnecchi) the whole cornea sloughed under the picture of neuroparalytic ophthalmia.

In another (Armaignac) the operation was followed by purulent destruction of the whole globe, a retro-bulbar phlegmon, and total union of the lower lid with the small stump, not admitting of the wearing of an artificial eye.

The sight of the good eye improved, the slight fog which veiled all objects, had disappeared. The patient was satisfied, *mais le déastre au point de vue esthétique fut complet.* While he was in Paris M. Maraignac heard of similar failures and even of a fatal case.

These experiments are certainly not very pleasant, and will probably have the effect of restricting the indications for the operation to a smaller latitude than that assigned to it by Schöler and Schweigger, viz., that it is destined to replace enucleation in all cases except malignant tumors. The worst feature of the operation and the one most dwelled upon by its adversaries, is the partial or total return of sensibility in the cornea, and even tenderness on pressure upon the ciliary region. Schöler concedes the fact, but states that thus far it has not been proved—save the above-mentioned exceptional case of Hirschberg—that sectioned and reunited nerves are still capable of transmitting sympathetic irritation. If the future should furnish such proof the operation need not be abandoned, but modified. A marked deviation of the globe, produced by conjunctival sutures or advancement of a muscle, would so separate the ends of the severed nerves as to render their reunion impossible. Schweigger seeks to obviate the reunion of the nerves by a thorough and extensive neurectomy, which he has performed many times, and described in the newest edition of his text-book, (beginning of 1880). His method is the following, (l. c., pp. 368 *et seq.*): The conjunctiva is divided vertically over the insertion of the internal rectus; two catgut sutures are passed through the muscle 5 *mm.* behind its insertion, and provisionally tied

so as to secure the muscle; the tendon is divided; the muscle dissected from the sclerotic; a double hook, inserted into the sclerotic near the equator, rolls the cornea outward; the insertions of both oblique muscles are cut; the whole posterior half of the globe is turned forward, denuded, as far as the equator, of all its overlying tissue, including the section of the vortex vessels; the eye is rolled back, and the posterior end of the internal rectus is reunited to its anterior end. Schweigger thinks that in this way no ciliary nerve could escape being divided, and the exsection of a piece of the optic nerve is a guarantee against its reunion. Both assertions have to stand the test of time. Longer pieces of nerves than Schweigger removes, have been seen to reunite in other parts of the body. The ciliary nerves which are not exsected but only cut, may certainly reunite, at least in part. He states that after the operation the cornea becomes insensible, with the exception of its peripheral zone, which is probably supplied from the conjunctival nerves. A reëstablishment of the full sensibility of the cornea would indicate the reunion of the ciliary nerves. Hirschberg quotes from Dor that Cruveilhier discovered that two or three ciliary nerves entered the sclerotic in its anterior part, under the recti muscles. One at least of these nerves could escape division in optico-ciliary neurotomy.

This may suffice to indicate the present status of development of the operation. It is now being performed everywhere, and the near future will give us more data to estimate its merits and demerits.

Since the publication of my paper on this subject in the previous number, I have performed six operations of optico-ciliary neurectomy, which I beg to report in brief, as a contribution to the discussion of this question.

CASE I.—*Injury in ciliary region. Sympathetic opththalmia four weeks, neurectomy eight weeks later. Circumscribed ulcer of the cornea of the eye operated on; decided improvement of the symp. ophthalmia.*

J. Croy, æt. 55, of New York, (333 E. 59th St.); addicted to drink, injured his left eye about February 20, 1880, and was treated

in one of the Ophthalmic Hospitals of this city. A month later the other eye inflamed. He was advised to have it removed to which he did not consent. Four weeks later, April 20th, he presented himself to me with a deeply retracted scar through the whole inner, and a part of the upper ciliary region of the left eye. The cornea was somewhat diminished in size, the globe soft and tender to the touch. S o. The right eye showed moderate circumcorneal injection, a dull-greenish looking iris, an immovable pupil, adherent to the lens all around. No details of fundus to be seen. F complete. Counted fingers at the distance of 1'. The eye had previously been good.

I performed the operation on the same day. Meridianal incision between upper and inner recti. The optic nerve was seized with the curved forceps described in Dr. Ayres' paper in this number, and cut between the forceps and the optic foramen. As it proved difficult to turn the posterior half of the globe forward, the tendon of the internal rectus was detached, after which the globe was turned easily, and the whole posterior half as far as the equator, carefully trimmed. The piece of optic nerve removed was only 2–3 *mm.* in length. Hemorrhage slight. The eye was turned back again, the tendon of the internal rectus stitched forward, and the conjunctival wound closed with a suture. There was exophthalmus, evidently not from post-ocular hemorrhage. The eyelids were held closed over the globe by two sutures, one near the inner, the other near the outer margin of the cornea. The swelling was moderate, the recovery without accident. The cornea was invisible.

From the second day the other eye began to improve, the circumcorneal injection diminished and the adhesions gave way first in the upper, then in the outer and lower parts, but on the inner side the pupillary edge of the iris remained adherent. The torn adhesions left a dense ring of brown pigment on the capsule. Sight also improved. Two weeks after the operation, without any known cause, there was more circumcorneal injection, which, however, disappeared in a few days. In the fourth week a shallow ulcer developed in the centre and lower part of the cornea of the injured eye which showed little tendency either to increase or to diminish. The patient remained in the hospital four weeks. He had several mild aggravations of his sympathetic ophthalmia. He left improved, but not cured. The inner part of the pupil was still adherent, the media so clouded that the details of the background could not be distinguished.

May 26th he presented himself again. His improvement was still greater. The pupil was large. Besides the ring of pigment, corresponding to the circular synechia, there were numerous brown dots irregularly deposited on the more peripheric parts of the capsule, demonstrating plainly that total adhesion had existed. The vitreous had cleared up so that the details of the fundus were recognizable. The outlines of the optic disk were ill-defined, yet there was not so much congestion and swelling as to justify the diagnosis neuritis. The retina showed no abnormity. Tn. F complete, S $\frac{10}{200}$.

Whether the patient will ultimately preserve his sight, and how much of it, I am, of course, not prepared to say.

Soon after him, a patient of mine, a child who had sustained an injury in the ciliary region of one eye, was effected with violent sympathetic iritis in the sixth week after the injury. The careless parents, though impressively warned, brought the child only on the fifth day. The pupil was adherent all around, the iris discolored, the anterior chamber dull, marked circumcorneal injection. I enucleated the other blind and shrunken eye at once. In two days all the adhesions were torn and the pupil was fully dilated; in five days the circumcorneal injection had disappeared. The eye has continued well.

CASE 2.—*Painful absolute glaucoma. Neurectomy. Recovery, i.e.*, preservation of shape and movements of the eye, and perfect relief from pain. The operation was performed as in the previous case, but without myotomy, and a large piece of the optic nerve was cut out. The posterior half of the globe extensively and thoroughly denuded. The lids were closed by sutures over the moderately protruding globe. Patient discharged on the thirteenth day. Cornea insensible.

CASE 3.—*Cyclitis dolens* in a woman of 35 years of age. Neurectomy as above, without myotomy; 4 *mm.* of nerve and the surrounding tissue removed. Posterior half of globe carefully trimmed. Wound and lids united by sutures, which are removed in a few days. No unusual reaction. Discharged on the fourteenth day. Eye free from pain; cornea insensible.

CASE 4.—*Uveitis chronica from piece of iron in ciliary region for seven months. Exsection of the foreign body, temporary im-*

provement of the uveitis Symptoms of irritation in other eye. Neurectomy (7 *mm.*) *Recovery.*

This case is reported in detail in my previous paper. See p. 207 of this number.

CASE 5.—*Enlarged and blind eye from old irido-choroiditis. Cornea opaque. Neurectomy. Gangrene of cornea of the sclera at the site of the wound and the interior of the eye.*

After the incision between the upper and superior recti and burrowing with squint scissors under the epi-scleral tissue and the superior and inferior recti, the curved forceps was introduced, and the optic nerve grasped and divided some distance behind the sclerotic. The upper and inner recti were drawn apart with squint hooks. The eye was easily rotated so that the optic nerve was brought forward. The whole package of tissue surrounding the optic nerve, which, with the nerve, was held between the branches of the forceps, cleanly dissected from the globe (10 *mm.* of nerve removed), and the posterior half of the ball trimmed as usual. Eyeball turned back, the wound united by two sutures and the lids closed by one suture near the cornea over the considerably protruding eyeball. The cornea anæsthetic. No unusual reaction.

On the fourth day, when the suture of the lid was cut, the tissue around the wound was found necrosed. On the evening of the same day the eyeball had protruded again and was almost carried beyond the palpebral fissure. Dr. Born, who had some difficulty in reducing it, closed the lids again with two sutures. These tore in two days and a part of the edge of the upper lid became necrosed. The cornea was whitish with black patches. Half of the eyeball protruded between the lids. An opening was made in the sclerotic with a Beers' knife, a few drops of a blackish, offensive liquid came out, but the globe did not collapse. The interior of the eye was explored with a probe, but no tumor was found. The operation was done on the eleventh of this month. Yesterday, May 24th, I exsected the cornea and a portion of the necrosed contents of the globe. The eye is markedly smaller and cleanses itself. It promises to furnish a good stump ; but two-thirds of the edge of the upper lid are pared off and deprived of the lashes. The dressing at first was the ordinary loose charpie bandage, but as soon as the gangrene began, we surrounded the eye with a high wall of absorbent cotton, kept moist with a solution of carbolic acid, and covered it with oil silk, thus keeping the eye in a moist chamber. The process was no suppuration, but plain and simple, very offensive

gangrene. The patient, a healthy negress of about 22 years, suffered considerable pain in the first week, but none after. The operation was very smooth so that I remarked to the students that gradually a regular method of performing this operation was being reached.

CASE 6.—*Chalky cataract in an atrophic eye from old iridochoroiditis traumatica, in a girl of 16 years of age.*

The neurectomy was done in the usual way, the nerve not seized with the forcces, but after rotation of the globe drawn forward with a squint-hook, and 2 *cm.* (9''') exsected. The insertion of the oblique muscles were detached, but the posterior half on the outer and upper side less extensively denuded than in the other cases, yet, as I thought, sufficient to cut all the ciliary nerves. The eyeball was easily replaced, and covered by the lids. Very slight protrusion. No reaction. The operation was done May 20th. Yesterday, May 24th, on testing the sensibility of the cornea, I found *that only the inner and lower parts were anæsthetic.*

AN ABSTRACT OF AMERICAN OPHTHALMOLOGICAL LITERATURE.

FOR THE FIRST QUARTER OF 1880.

By SWAN M BURNET, of Washington, D. C.

1. Pilocarpine in iritis. By F. Buller. *Cin. M. and S. J.*, Dec., '79.

B. has found hypodermic injections of pilocarpine useful in some cases of iritis which appeared obstinate to the ordinary mode of treatment. They were of the form known as rheumatic or seroplastic, and in one case there was an accompanying + T. In addition to the use of pilocarpine, atropine, mercury or iodid. pot., were also used.

2. Two cases of enucleation of the eyeball, followed by immediate relief in important nervous diseases. By G. T. Stevens. *Alienist and Neurologist*, Jan.

Case 1.—Enucleation of an eyeball for symp. trouble in its fellow. The patient had been troubled with diabetes insip. ever since the injury to the lost eye, also with supra-orbital pain and pain in the region of the stomach. All symptoms much relieved after enucleation, and an increase in symptoms was subdued by faradism along the course of the supra-orbital.

Case 2.—Enucleation of an eyeball, followed by immediate recovery in a case of epileptiform disease, associated with diabet. insipid.

3. Injuries to the eye. By R. Sattler. *Cin. Lancet and Clinic*, Jan. 5.

This is a continuation of the paper noted in the last No. of the Archives. In this paper Dr. S. notices: 1st. Penetrating, incised or punctured wounds of the sclera, especially of the ciliary zone, pointing out the danger of symp. trouble in the other eye which always accompanies wounds in that region, several cases being given; 2d. Penetrating foreign bodies of ciliary body, vitr.

humor, retina and choroid, illustrated with several cases; 3d. Rupture of the globe and commotio oculi; 4th. The inflammatory results that may follow various operations on the visual apparatus.

4. Neurotomy optico-ciliaris, a new operation in ophthalmic surgery. By C. J. LUNDY. *Mich. Med. News*, Jan. 10.

Reports a case which was successful up to the time of publication of his paper.

5. Iritis spongiosa (fibrinosa). By SWAN M. BURNETT. *Amer. Journ. Med. Sci.*, Jan.

B. points out the peculiarities of this form of iritis, as illustrated by a case from his own practice and abstracts of previously reported cases.

6. A clinical lecture upon the operation for inversion of the lower lid. By F. C. HOTZ. *Chic. M. J. and Exam.*, Jan.

H. applies the same principle of stitching the integument to the border of the tarsal cartilage as he recommended in his article on 'a new operation for entropion and trichiasis,' published in Vol. viii, No. 2 of these ARCHIVES. The reporter has tried this plan with satisfaction in one case.

7. Phlyctenular ophthalmia. By H. S. SCHELL. *M. and S. Rep.*, Jan. 17.

Sch. gives a good account of the clinical history of this very common and troublesome affection, but seems to have nothing specially new to offer as regards its therapeutics.

8. Dacryocystitis in infants. By S. C. AYRES. *Cin. Lancet and Clinic*, Jan. 31.

Dr. A. gives four cases of this character in nursing infants. His treatment was to slit up the canaliculus and probe as in adults. His success has been good. The reporter has seen several cases of this kind, one in a negro child.

9. Neurotomy of the optic and ciliary nerves as a substitute for enucleation of the eyeball. By H. W. WILLIAMS. *Bost. M. and S. Journ.*, Jan. 22.

An account of the nature and principles of the operation, but not illustrated with any cases.

10. On cysticercus cellulosæ. By C. S. TURNBULL. *Cin. M. News*, Feb.

The cysticercus was observed moving about in the fundus, and was finally observed to attach itself to the post. capsule of the lens. It was extracted alive by the Gräfe method for the extrac-

tion of the lens; whether the lens itself was extracted is not stated. Dr. T. then proceeds to give a detailed account of the parasite in all its forms and stages, giving copious reference to authorities.

11. Short clinical reports from cases treated by Dr. J. J. CHISHOLM at the Presbyterian Eye and Ear Infirmary. *Gaillard's Med. Monthly*, February.

Of these we select, by title, a few of most interest.

1. Lens successfully extracted by a blow from a piece of wood. 2. Buphthalmus, with irregular displacement of the pupils, a congenital condition. 3. Arrest of development of the eyeball. The right eye was entirely absent; a very small globe with a clear cornea remaining in the left socket. 4. Symp. irritation after 32 years loss of an eye, also one after 34 years. 5. Diphtheritic conjunctivitis without other manifestations. 6. Neurotomy for stab in the eye, involving the ciliary region. Result up to time of report good. 7. Congenital absence of eyeballs. 8. Specific iritis relieved by large doses of salicylicate of sodium.

12. Relation of refractive and accommodative errors to defective sight, and certain disturbances of the nervous system. By J. E. HARPER. *Ind. Med. Rep.*, February.

A general consideration of the subject, but not illustrated with any cases.

13. Gonorrhœal conjunctivitis. By LUCIEN HOWE. *Buf. M. & S. J.*, February.

For protection of the still unaffected eye in cases of gonorrhœal conjunct., H. uses a shield of mica, which is accurately adapted to to the nose, brow and cheek of the sound side by means of adhesive strips.

14. Boracic acid, a new remedy in eye diseases. By SAM'L THEOBALD. *Med. Rec.*, Feb. 7.

By a sort of universal consent, antiseptics have recently come prominently forward in the treatment of various forms of eye disease. What is at present claimed for the various agents: benzoate of soda, salicyl. acid, boracic acid, etc., may not be fully realized, but there can be no question of their superiority in certain classes of cases. T. was not probably aware at the time he began the use of boracic acid, of the researches of Paul Strasser (Dissertation, Berne, 1879) on the action of the various disinfectants on the normal conjunctiva and on the process of putrefaction. The conclusions at which S. arrived are, that of all the disinfectants

boracic acid is the least irritating, but is at the same time as efficacious an antiseptic as any.

Th. has used the acid, generally in the strength of 4 grs. to ʒi, in all forms of conjunctival inflammation with what he considers a remarkable success, it being specially useful he thinks in the hyperæmia accompanying asthenopia and refractive troubles; also in various forms of keratitis.

The reporter can corroborate in the main the statements of Dr. Th. in regard to the usefulness of boracic acid. I have also found the antiseptic mixture of Sattler (1 pt. salicyl. acid, 3 pts. boracic acid, to 100 pts. water) very efficacious in the same class of affections.

15. The eye-parasite—dracunculus doa. *Med. Rec.*, Feb. 28.

Dr. H. M. Bacheler sends from Garoon, W. coast of Africa, an account of an extraction of this parasite from the interior of the eye: (ant. choroid.) "Its situation" he says, "was on the iris beneath the sclera (cornea?)" and it moved about in the ant. chamb. He made an incision at the junction of the cornea and sclera with an "eye-knife, taking care that one end of the worm was between the knife and the sclera (cornea?)." By a depression of the knife the worm was then brought to the opening made, and was seized by forceps and extracted whole. He says it is not considered, in that region, dangerous or even serious.

16. Ossification of the ciliary body and choroid. By C. J. LUNDY. *Med. Rec.*, March 6.

The eye which had been subject to inflammation for years was removed on account of symp. irritation in its fellow. The ant. portion of the choroid and the whole of the ciliary body were found transformed into true bone. Two cuts are given, one showing the extent of the bony formation, the other the microscopic appearance of thin sections of the bone.

17. Several cases of cataract illustrating the importance of Prof. H. Knapp's method of extraction. By H. CULBERTSON. *Cin. Lancet and Clinic*, March 20.

The cases are five in number, and in all of them the peripheral capsulotomy was *involuntary*, he having failed to lacerate the ant. capsule, and the capsule was ruptured at the periphery during manipulation. In all, a secondary cataract remained which was incised, and good V. resulted. The operations were made before Knapp's publications and would deserve a mention in the history of that method.

18. Formation of Eyelid by transfer of large piece of skin without pedicle. By H. D. NOYES. *Med. Rec.*, March 27.

This is the fourth case of N. and a success,* the other three having been failures, from the fact, N. thinks, that he did not take the proper precaution in fastening down the bit of skin. For the success of the operation the following are in his judgement important factors :

"1. The piece of skin must be dissected so as to be entirely free from subcutaneous tissue and fat. 2. The piece of skin should not be secured in position by means of sutures, but by coaptation with gold-beater's skin or such means as maintains absolute immobility during the entire process of union. 3. There must be expected an extraordinary contraction when the piece of skin is separated from its surroundings."

19. Remarks on lipæmia retinalis occuring in a case of diabetes mellitus. By A. G. HEVL. *Phila. Med. Times*, March 27.

Dr. H. presented to the Phila. Co. Med. Soc. a picture of the fundus oculi of a man suffering from diabetes mellitus, in which the veins were very large and very light in color ; the arteries were also very light in color and could scarcely be distinguished from the color of the fundus. An undue amount of fat being found in the blood under the microscope, he thinks the peculiar appearance of the retinal vessels due to this fact.

20. Report of 185 cataract operations with some suggestions as to certain modes of operating, after-treatment, etc. By A. W. CALHOUNE. *Trans. Amer. Med. Ass.*, 1879.

Of these operations 135 were for extraction, which he performs as nearly after the plan laid down by Gräfe as possible. Of these there were 80.8 per cent. of complete successes (V. from $\frac{1}{10}$-$\frac{1}{1}$), 7.4 per cent. of half successes (V. from $\frac{1}{200}$ to $\frac{1}{10}$), 1.5 per cent. of curable blindness, 6.6 per cent. of incurable blindness.

Of the 49 cases of discission 51 per cent. were complete successes, 40.8 per cent. incomplete, 4 per cent. curable blindness, 4 per cent. incurable.

21. A brief examination into the comparative merits of some of the operations for the extraction of hard cataract, with remarks upon the operations proposed for the relief of certain cases of lamellar or zonular cataract. By B. A. POPE. *Trans. Amer. Med. Assoc.*, 1879.

* When the patient was presented after the reading of Dr. Noyes' paper at the N. Y. Academy of Med., the implanted flap was excessively shrunken, being a narrow strip about 2 *cm.* in length, and scarcely 4 *mm.* at its greatest height.—*Knapp.*

A brief abstract cannot do this admirable paper justice. We can only give his conclusions in brief. "That its motive has been to call attention to the large corneal flap operation and its modifications, since it seems to me that it offers the best solution of the hard cataract problem. In addition, I have wished to offer my testimony to the superiority, according to my experience, of the sclero-corneal flap operation, with iridectomy over all other operations combined with iridectomy, which I have tested."

22. Temporary blindness from quinine. By A. H. VOORHIES. *Trans. Amer. Med. Ass.*, 1879.

The patient, a young woman, had taken more than 1,300 grains of quinine by mouth and rectum within three days. There was paleness of the face and great prostration. Pupils normal; anæsthesia of the cornea. No p. l. Oph. showed the disk bloodless, not a vessel to be seen; choroid in similar condition. Nitrite of amyl and strychnia were tried in treatment, but no improvement was noticed until the tenth week. Recovery was then gradual until J. 1 is read.

The discs, at last examination, were white with only a very slender central vessel. V. F. much contracted.

23. Relief of xerophthalmia by operation. By E. SMITH. *Trans. Amer. Med. Ass.*, 1879.

The plan followed by S. is fashioned on that of Buller, published in the *R. L. O. H. Rep.* for May, 1876, and is as follows: The lids are detached from the globe and the ciliæ and interior bulbs cut away. A vertical incision of 3 lines is made over the cornea in the upper lid. These flaps are dissected back and a triangular piece of the lid with the base downward removed. The flaps were then adjusted over the edges of the triangular opening. The edge over the lower lid was freshened except at the point corresponding to the base of the triangular opening in the upper lid, and the two lids united with four sutures. In the case related the benefit was marked.

24. Ivory exostosis of the orbit. By E. WILLIAMS. *Trans. Amer. Med. Ass.*, for 1879.

The patient was a woman of 23, in whom an exophthalmus and divergence was first noticed three years before she came under observation. The eye, when seen, was pressed upward and outward and the cornea protruded half an inch in advance of the other. There was a marked neuro-retinitis and V. was nil. The eye was enucleated, and the tumor found attached to the inner

wall of the orbit extending nearly to the apex. It was denuded of periosteum as extensively as possible, and an attempt made to rip off a piece with the bone forceps. The tumor was found so very hard that this plan was abandoned, and the bone forceps opened to their fullest extent and pressed down to the base of the tumor, and by a few wriggling movements it came away *en mass*, bringing no sound bone with it. With the exception of a severe hemorrhage from the nose on that side that night, the case progressed well. Several cases from the literature of the subject are given.

25. On cataract extraction. By H. KNAPP. *Trans. Amer. Med. Ass.*, 1879.

Dr. K. gives the results of 916 extractions of cataract—553 done in Heidelberg, 363 in New York. The flap extraction he did 140 times, with 82.9 per cent. of good results, 3.6 per cent. moderate, and 13.5 per cent. of failures. This operation has never been satisfactory in its course of healing and results, and he has followed for years the Gräfe method almost wholly. Of *modified extractions* he has made 735, with the following results: good, 86.6 per cent.; moderate, 7.3 per cent.; failure, 6.1 per cent. He has performed *linear extraction* 41 times, but has almost abandoned that method.

26. Operations for cataract. By A. BLITZ. *Trans. Amer. Med. Ass.*, 1879.

In a patient of 71 years there was an expulsion of the cataract in its capsule before the iridectomy was made, caused by a "squeezing" of the orbicularis. The case did well. Such a case has happened to the reporter. It was in a negro woman, and the incision was made *secundem artem* (Gräfe), but the patient, whose orbicularis was extraordinarily strong, strained, and out came the lens in the capsule before an iridectomy was made. The wound gaped widely, at least 7 *mm.*, and was filled with vitreous and prolapsed iris. The eye was quickly closed and bandaged. On inspection the next morning the wound was found to be perfectly coapted, but there was, of course, enclavement of the iris. There was no inflammation and but slight irritation, and the case made an excellent recovery. It is over a year since, and no iritis has developed on account of the enclavement. I have noticed that the orbicularis in the negro is unusually strong, which much increases the danger of such accidents where an anæsthetic is not used.

27. Report on ophthalmology. By H. KNAPP. *Trans. Amer. Med. Ass.*, 1879.

An excellent running comment on the progress of ophthalmology for the preceding year.

28. Fibro-sarcoma of orbit, with cystoid development. By C. S. BULL. *Med. Rec.*, March 6th.

The eye had been enucleated twelve years before. One year ago the patient began to have difficulty in keeping his artificial eye in place. The orbit, when first seen, was filled with a growth covered by conjunctiva. It was removed entire, and was found to have no adhesion anywhere except at the apex. On examination it was found to be fibro-sarcoma.

29. Sarcoma of choroid and optic nerve. By C. S. BULL. *Med. Rec.*, Feb. 28th,

It was in the person of a woman aged 26, who noticed, 16 months previously, that she was totally blind in the left eye, and that the eye was abducted. On enucleation the choroidal tumor was found to have pushed through the occular walls of the optic nerve entrance, and to have followed the nerve and sheath as far back as it could be examined.

30. Ophthalmic notes. By C.R. AGNEW. *Med. Rec.*, March 13th.

1st. *Use of electricity in the treatment of cataract.*—A. does not think any important changes can be brought about in cataract by the use of electricity.

2d. *Scant feeding in ophthalmic cases*—For years A. has taught and practiced the following rules: 1. Ascertain the amount of real labor which the duties of the patient impose. 2. Estimate the probable force which the patient possesses. 3. Estimate with reference to the quality and quantity of food used. He then prescribes in writing the daily course of regimen, with emphasis and precision. He denounces strongly the common practice of cramming in schools.

3d. *Abuse of strong agents in the treatment of simple catarrhal affections of the eye.*—Recommends tan. acid, grs. v; glyc., ʒ ij; benzoat. sod., ℈ ij; camphor water, ℥ iv. To be used in form of a spray.

4th. *The ophthalmoscope in cerebral disease.*—Does not have any confidence in so-called "cerebroscopy."

REPORT ON THE PROGRESS OF OPHTHALMOLOGY FOR THE FIRST HALF OF THE YEAR 1879.

(Continued from Vol. ix, 1, p. 96.)

By Dr. A. NIEDEN, of Bochum.

Translated by Dr. R. O. Born, of New York.

IV.—SPECIAL PATHOLOGY.

CONJUNCTIVA.

256. Boucheron. Chancre of the eye. (*L'Union*, No. 38.)

257. Bull, Charles Stedman. Syphilitic gummata of the conjunctiva. A gummous tumor was situated upon the sclerotic between the superior and external muscles. (*Transact. Amer. Ophth. Soc.*, 1878, pag. 415.)

258. Bitsch. Ectropium sarcomat. palp. sup. oc. utr. Cured with sutures by Snellen's operation. (*Z. M.*, March, 1879, pag. 86.)

259. Foxonet. Étude sur la conjonct. granuleuse. (*Thèse de Paris*, 1879.)

260. Guirineau. Diverses formes d' injection de la conjonctive. (*Thèse de Paris*, 1879.)

261. Hamande. Chancre infectant de la paupière inférieure. (*Arch. Méd. Belg.*, March, 1879 ; *conf. C. f. Ch.*, No. 21, 1879.)

262. v. Hippel. Amyloid degeneration of the lids on both sides to such an extent that the palpebral fissures could not be opened any more. The whole tarsus and a piece of conjunctiva, 30 *mm.* long, 20 *mm.* broad and 6 *mm.* thick were removed. Healing very good and without considerable cicatricial contraction, functions of eye preserved. (*A. f. O.*, vol. xxv, 2, pag. 1, *cfr. Jubiläumsschrift*, with two plates. *Berlin, Peters, and Sitzungsb. d. Ophth. Gesellsch. zu Heidelberg*, Aug., 1879.)

263. LABACH. De la blépharo-conjonctivite. (*Dissert. inaug.*, Paris, 1879.)

264. LEBER. Amyloid degeneration of the conjunctiva from a clinical standpoint, and remarks on the etiology of local and general formation of amyloid bodies. The author holds that it is a local affection which is similar to the sclerozing hypertrophy of connective tissue and that, in some cases, it has undoubtedly to be regarded as a consequence of intense trachoma. (*A. f. O.*, vol. xxv, 1, pag. 315.)

265. MANDELSTAMM and BOCOWITSCH. A case of amyloid degeneration of the bulbar and palpebral conjunctiva in a woman, 52 years of age, who had in her left eye trachoma in the cicatricial stage and in the right amyloid degeneration of the conjunctiva. The cornea was surrounded by a wall 4 *mm.* high; after this had been removed by pieces, the process in the conjunctiva and cornea disappeared. (*A. f. O.*, vol. xxv, 2, pag. 248.)

266. MARRONI ARRIGO. Trachomatous conjunctivitis. (*Riv. clinic.*, 2 S., vol. viii, 10, pag. 296.)

267. PROUT, J. S. Lachrymal conjunctivitis. (*Trans. Am. Ophthal. Soc.*, pag. 397.)

268. TASTOT DE MENS. De l' ophthalmie granuleuse dans les écoles. *Thèse de Paris*, 1879.)

CORNEA.

269. v. ARLT. On the etiology of keratitis, treats especially of the affections which are caused by local or constitutional disturbances of nutrition. (*Wiener. Med. Wochenschr.*, No. 5, 1879.

270. BERNAUER. De l' hypopyon et de son traitement. (*Diss. inaug.*, Paris, 1879.)

271. COURSSERANT. Two cases of sympathetic keratitis. They do not deserve this name. (*A d' Ocul.*, vol. lxxxi, 1 and 2, 1879.)

272. CUIGNET. Kératocèle. (*R. d' Ophth.*, Jan., 1879, pag. 11.)

273. FÉVÈRE. Kératocone. (*Thèse de Paris*, 1879.)

274. GALEZOWSKY. Sur la kératite glycosurique. (*Soc. de Biol. Séance* 4, i, 1879, and *Gaz. Méd.*, No. 4, 1879.)

275. GOLDZIEHER. Ribbon-shaped opacity of the cornea. He found colloid changes in the cornea, especially in the superficial layers. (*C. f. A.*, Jan., 1879, pag. 2.)

276. HIRSCHBERG. Herpes zoster front., with neuroparalytic destruction of the cornea. (*A. O.*, vol. viii, 3, pag. 351.)

277. KNAPP. Foreign bodies in the cornea. (*A. O.*, vol. vii, pag. 313.)

278. LACOMBE. Kérat. interstit. dans la syph. acquise. (*Thèse de Paris*, 1879.)

279. LEBER. Kératomycosis aspergillina causing hypopyon-keratitis. Thus far the only case observed. (*A. f. O.*, vol. xxv, 2, pag. 285.)

280. LÜDERITZ. Right-sided neuroparalytic ophthalmia in a boy 5 years of age, complicated with squint, facial paralysis and optic neuritis. The post-mortem examination showed tubercles in the thalamus opticus, the floor of the third ventricle and the pons. (*Thür. Aerztl. C.*, 1879, *C. f. M. W.*, 1879, No. 25.)

281. MCDOWELL, N. J., of Baltimore. Keratitis ostrearii. It is observed in oyster shuckers, and is caused by infection. (*Virg. Med. Monthly*, Feb., 1879.)

282. SELLERBECK. Ribbon-shaped opacity of the cornea. He relates ten cases and distinguishes an atypical and a typical form, the latter, however, not predisposing to glaucoma, The granules consist of chalk- and magnesia-concretions underneath the epithelium. (*Char. Annalen*, 1879, pag. 468–488.)

283. THIELEMANN. Hypopyon-keratitis; good results were obtained by Sämisch's operation. (*Inaug. Dissert., Greifswald*, March, 1879.)

284. JONES, WHARTON. A case of injury of the cornea. (*Lancet*, 1879, No. 3, June 18th.)

IRIS, CILIARY BODY AND CHOROID.

285. BITSCH. Intermittent hypopyon, recurring eight times at the regular interval of seven days without any demonstrable cause, in an eye with iritis after a severe contusion. There was probably cyclitis. (*Z. M.*, Feb., 1879, pag. 56.)

286. CONNOR. Sympathetic irritation produced by a bony growth inside the eye. (*Detroit Lancet*, Jan., 1879.)

287. COTTENOT, HENRY. Du staphylome postérieur. (*Thèse de Paris*, 1879, 16 pages.)

288. CUIGNET. Iridocèle, Phakocèle et Vitrocèle. Words for well-known things. (*Rec. d' Ophth.*, Jan., 1879.)

289. CUIGNET. Irite périph. on circonférencielle, meaning a gumma of the lower ciliary portion. (*Rec. d' Ophth.*, Feb., 1879.)

290. DYER, E. Sympathetic ophthalmia. (*Trans. Med. Soc. of the State of Pennsylv.*, vol. xii, 1, pag. 124.)

291. DEIRANTHON, JEAN. Contribution à l'étude de la sclérochoroidite postér. (*Thèse de Paris*, 1879, 52 pages.)

292. FOURNET. The influence of warmth and light on the development of choroiditis. Two cases produced by radiating heat. (*Rec. d' Ophth.*, June, 1879.)

293. HIRSCHBERG. Sympathetic Iridocyclitis. 1, without prodromal symptoms after a cataract extraction with normal course of healing. In spite of immediate enucleation total atrophy of the secondarily affected eye. 2, six weeks after an injury in the ciliary region, iritis and retinitis without prodromal symptoms; recurring attacks, considerable diminution of S. (*A. O.*, vol. viii, pag. 224.)

294. HIRSCHBERG. Choroidoretinitis latens. (*A. O.*, vol. viii, pag. 365.)

295. JANY. A case of colloid excrescences in the lamina elastica choroideæ at the papilla, similar to that of Nieden, (*cfr.*, No. 128, 1879), and confined to the circumference of the optic nerve entrance. S. and Fv. were normal, no other pathological changes could be seen in the fundus. (*C. f. A.*, June, 1879, pag. 167.)

296. KNAPP. Foreign bodies in the anterior chamber, iris and choroid. (*A. O.*, vol. vii, pag. 317 ff.)

297. LANDESBERG. Sympathetic panophthalmitis. With a painful phthisical stump on one side, there was corneal affection of the other eye leading to perforating ulcer and panophthalmitis. (*Z. M.*, June, 1879, pag. 233.)

298. JONES, MACNAUGHTON. Symmetrical corectopia with dislocation of the lens. (*The Dublin Journ. of Med. Scienc.*, Feb., 1879.)

299. MAUTHNER. Sympathetic ophthalmia. The author thinks there is transmission by both channels, along the optic nerve for the inflammatory processes of the retina and optic nerve, and through the ciliary nerves for those of the uveal tract. This double transmission can frequently occur simultaneously. (*Lectures on Ophthalmology*, part 2, Bergmann, Wiesbaden.)

300. PAGENSTECHER, HERMANN. Laceration of the optic nerve by a blow, with remarks on sympathetic iridochoroiditis, amaurosis. Four weeks later sympathetic inflammation. The examination showed that the optic nerve had been entirely torn off,

the transmission could therefore only have taken place through the ciliary nerves. (*A. O.*, vol. viii, pag. 242.)

301. SAMELSOHN, of Cologne. Tuberculosis of the iris in a girl 17 years old. (*C. f. N., u. Heilk., Bonn. Anatomical demonstration at the meeting of the Ophthomological Society at Heidelberg.*)

302. STRAWBRIDGE. Cyst of iris after an injury. (*Trans. Am. Ophth. Soc.*, 1879.)

GLAUCOMA.

303. ABADIE, CHARLES. Glaucoma. He adheres to the theory of neurotic disturbance of secretion. (*A. d' Ocul.*, vol. 83, 3 and 4, 1879.)

304. BRAILEY, of London. The pathology of glaucoma. There is always a considerable dilatation of the vessels in the interior of the eye, being often twice the normal calibre, especially of the vessels which supply the ciliary region. This always precedes the atrophy of the ciliary muscle. (*C. F. A.*, June, 1879, pag. 179.)

305. DERBY. The rel. frequency of glaucoma in Europe and America. He found in European statistics 1.28 per cent., in American only 0.51 per cent. (*Boston Med. Journ.*, March, 1879. *Med. Times and Gaz.*, 1879, No. 1505.)

306. SPENCER, WATSON. Eyeball-tension, its effect on the sight and its treatment. (*London, Lewis*, 1879, 70 pages.)

307. WALKER, E. Essays in ophthalmology. He treats first of glaucoma. Individual opinions about the nature and cure of glaucoma. (*London, Churchill*, 1879, 239 pages.)

308. WEBSTER, DAVID. Is glaucoma ever of sympathetic origin? (*Arch. of Med.*, April, 1879.)

RETINA AND OPTIC NERVE.

309. ABADIE. Some disturbances of vision by changes at the yellow spot which cannot be seen with the ophthalmoscope. Scotomata, micropsia, metamorphopsia. (*A. d' Ocul.*, vol. 83, 3 and 4, 1879.)

310. ANGELUCCI. Marantic thrombosis of the left central vein with acute amaurosis produced by endarteritis. (*Z. M.*, April, 1879.)

311. BITSCH. Neuroretinitis in a chlorotic girl 16 years of age. (*Z. M.*, April, 1879, pag. 144.)

312. CHRISTENSEN. Epileptic amaurosis. (*Ugeskr. f. Laien.*, 3 R, vol. xxvii, pag. 15, 18.)

313. COURIS. Du décollement de la rétine et son traitement par l'iridectomie. (*Thèse de Paris*, 1879.)

314. DIKINSON, W. Specific neuritis, hemianopsia. (*St. Louis Med. and Surg. Jour.*, vol. xxxvi, No. 6, June, 1879.)

315. GALEZOWSKY. Sur les thromboses des vaisseaux rétiniens. (*Gaz. Méd.*, No. 17, 1879.)

316. GALEZOWSKY. Des amblyopies et des amauroses toxiques. 1, Alcohol, 1 per cent. of all the cases; 2, Nicotine; 3, Opium. (*Paris*, 1879. *P. Asselin.* 172 pages.)

317. GALEZOWSKY. Amblyopie aphasique. (*Arch. Génér.*, May, 1878.)

318. GALEZOWSKY. Congenital amblyopia and amaurosis. (*Rec. d'Ophth.*, 1879, Jan., pag. 22.)

319. GARLICK. The ophthalmoscopic image in tubercular meningitis. There were changes of the optic disk in 80 per cent., optic neuritis or only dilatation of the retinal veins. An increase of the changes is especially important. Choroidal tubercles are of very rare occurrence. (*Lancet*, 1879, June 14.)

320. GOWERS, Epileptic attacks, double optic neuritis, in consequence of glioma of the right frontal lobe. (*Lancet*, 1879, No. 10.)

321. GROSSMANN. Neuroretinits oc. utr., amaurosis, diabetes. The *post-mortem* examination showed a tumor at the base of the brain. (*Berl. Klin. Wochenschr.*, 1879. No. 10.)

322. HERZENSTEIN. A case of reflex-amblyopia after a gunshot wound of the supra-orbital region. (*C. f. A.*, March, 1879.)

323. HIRSCHBERG. Tobacco amblyopia and kindred affections. (*Berl. Klin. Wochensch.*, 1879, No. 3.)

324. HIRSCHBERG. Right-sided hemiplegia, with left-sided oculomotor paralysis and bilateral optic neuritis in a child. Tubercle in the left half of the pons. (*A. O.*, vol. viii, pag. 224.)

325. HIRSCHBERG. Choked disk caused by a brain tumor in the anterior portion of the cerebellum, and with numerous grayish-red tumors of the medulla oblongata. (*A. O.*, vol. viii, pag. 226.)

326. HIRSCHBERG. 1, Retinitis ex hæmophilia. 2, Embolism of the central retinal artery. 3, Scotoma centr. hereditar. 4, Neuro-retinitis specifica. 5, Ring scotoma in specific retinitis. 6. Lead amaurosis. 7. Acute amaurosis potatorum. 8, Station-

ary atrophy of the optic nerve after neuritis. (*A*, O., vol. viii, pag. 359–364.)

327. HULKE, J. W. Case of recovery after evacuation of a traumatic abscess in brain by trephining and incision. Optic neuritis, fracture of frontal bone, commotion of brain. Trepanation and aspiration of the matter from underneath the dura. Healing with total amaurosis. (*Brit. Med. Journ.*, vol. i, pag. 388. *London Med. Surg. Soc. cfr. C. f. Ch.*, 1879, No. 28.)

328. JANY. Case of temporal hemianopsia. (*C. f. A.*, March, 1879, pag. 101.)

329. LANDESBERG. Neurosis and amblyopia sympathica. 18 months after the enucleation of an injured globe, concentrical limitation of the visual field and diminution of sight. Recovery after the excision of the painful stump. (*Z. M.*, June, 1879, pag. 235.)

330. LASINSKY. Sudden amaurosis after resection of the infra-orbital nerve. First ptosis, then exophthalmus, later atrophy of the optic nerve. (*Börner, Deutsche Med. Zeitung*, 1879, No. 24.)

331. LEBRIS. Les diff. formes cliniques des atrophies papill. (*Thèse de Paris*, 1879.)

332. LITTEN. The diagnosis of kidney diseases from the ophthalmoscopic picture of the retina and optic disc. In one case he saw the white plaques at the yellow spot and around the optic disk disappear entirely; in another case there was at each attack of uræmia a distinctly increased swelling of the optic disc and of the very tortuous veins, and more pronounced opacity of the optic disc. (*Charité Annal.*, 1879, vol. iv.)

333. MACKENZIE. Embolic hemiplegia with optic neuritis after ulcerous endocarditis. (*C. f. Med. Wissensch.*, 1879, No. 22, *Brain*, vol. iii, 1878, pag. 400.)

334. MANDELSTAMM, of Riga. On the etiology of central scotoma. He found, 1, in a pregnant woman, after severe bleeding from the nose, the temporal side of the disc and retina slightly veiled; 2, also after prolonged bleeding from the nose papillitis in an anæmic woman. (*C. f. A.*, June, 1879, pag. 175.)

335. MAURICE. Contributions à l'étude des amblyopies sympt. de la syphilose cérébrale. (*Thèse de Paris*, 1879.)

336. MENGIN. Rétinit. syphilitique. (*Rec. d'Ophth.*, Feb., 1879.)

337. NOËL, GUENAU DE MUSSY. Aphasical amblyoia. (*Rec. d'Ophth.*, March, 1879.)

338. OXLEY. Rétinitis albuminurica gravidarum. Twice pregnant within two years; the first time retinitis; the second time right-sided hemiplegia with conjugate deviation of both eyes. (*Lancet*, March 29, 1879.)

339. PARINAUD. Atrophy of the optic nerve after erysipelas. The author doubts the occurrence of optic neuritis stated more frequently by other observers. (*Arch. Génér. de Méd.*, June, 1879.)

340. PERKOWSKY. Acute amaurosis of both eyes during convalescence after amputation of the thigh. Probably the result of nephritis. (*Gaz. Lekarska*, 1879, No. 19, *cfr. C. f. Chir.*, 1879, No. 29.)

341. SAMELSOHN. Case of fulminant transitory blindness in a child 2½ years old, after diarrhœa. (*Allg. Aerztl. Verein Cöln; Berl. Klin. Wochensch*, No. 6, 1879).

342. SIGISMUND. Chorio-Retinitis. Hypeæmia of the kidneys with the secretion of the kidneys almost entirely arrested, persisting for years without any particular general disturbances (*Berl. Klin. Wochensch*, 1879, No. 16).

343. TACHARDT. Double neuritis in tubercular meningitis. He points it out as an important diagnostic symptom. (*Gaz. des Hôp.*, 1879, No. 20).

344. VOORHIES, of Memphis. Amaurosis after quinine-intoxication. (*Trans. Amer. Med. Assoc.*. May, 1879, No. 6–9).

345. WEBSTER. The etiology of Retinitis pigmentosa. Consanguinity was found in 13 per cent. of the cases. (*Trans. Am. Ophth. Soc.*, 1878, p. 495).

VITREOUS BODY.

346. KNAPP. Foreign bodies in the vitreous. (*A. O.*, vol. viii., p. 330).

347. PONCET. Du décollement hyaloïdien. (*Progr. Méd.*, 1879, No. 6, p. 103).

LENS.

348. ADAMÜCK. Contributions to the pathology of the lens. 6 per cent. diseases of the lens. Treats of: 1, Luxation of the lens; 2, Formation of cataract. (*A. f. Augenhlk.*, vol. viii., 2, p. 150).

349. HIRSCHBERG. Cataracta diabetica. (*A. O.*, vol. viii., p. 358).

350. KNAPP. Foreign bodies in the lens. (*A. O.*, vol. vii., p. 317.

351. JONES, MACNAUGHTON. Symmetrical ectopia of pupil and lens. Two cases, brother and sister. (*Dublin Journ. of Med. Science*, Feb., 1879).

352. RODET. Étude sur les Ruptures de la zonule de Zinn et la Subluxation Traumatique du Cristallin. (*Thèse de Paris*, 1879).

353. TRÉLAT. Cataract after Typhus. 2 cases. (*Gaz. des Hôp.*, May, 1879).

354. VIEUSSE. Subconjunctival luxation of the lens by a blow in a woman 60 years old. Spontaneous restoration of sight. (*Rec. d'Ophth.*, Febr., 1879).

ACCOMMODATION AND REFRACTION.

355. BARRAQUER. Mydriasisy parrálisis de la accommodacion par accion refleja. (*Gaz. Méd. de Cataluna*, Apr. 10, 1879).

356. CUIGNET. Astigmatisme composé et oblique. (*Rev. Clinique in Rec. d'Ophth.*, Febr., 1879).

357. JUST. Contributions to the statistics of myopia. He found at the gymnasium of Zittau 38.6 per cent of the students myopic, at the polytechnicum 20.7 per cent., in the second class as many as 80 per cent. (*A. f., Aug.*, vol. viii., 2, p. 191).

358. PESCHEL. On the astigmatism in indirect vision. Practical experiments based upon the researches of HERMANN, show that the eye possesses a very high degree of periscopy by which it is very well adapted to peripheric vision. (*Unters. aus dem Physiol. Laborat. zu Zürich*, 1879).

359. ROOSA, ST. JOHN. The relations between Blepharitis ciliaris and Ametropia (Hyperopia and Astigmatism). (*Trans. Amer. Ophth. Soc.*, 1878).

360. SCHILLBACH. Examination of the eyes of schoolboys at the gymnasium of Jena. (*Jahresb. über das Gymnasium zu Jena*, 1879).

361. SOELBERG-WELLS. Spasm of the ciliary muscle. It must be suspected if myopia has become rapidly and highly developed in a short time. (*Lancet*, 1879, No. 7).

362. In Switzerland, among 43,389 conscripts, 41,881 had nor-

mal S ; 2,305=5.3 per cent. were myopic. (*Vossische Zeitung*, Febr., 1879).

OCULAR MUSCLES.

363. BERGER. Paresis of the orbicular muscle is always a distinct, although sometimes only little pronounced symptom in cortical hemiplegia ; the sympathetic nerve also can be involved. (*C. f. Nervenhlk.*, vol. ii., 1879, No. 9).

364. BOUCHERON. De strabisme converg. (*Compt. rend.*, 17, March, 1879).

365. CHARCÔT. Lead-paralysis. The author could always prove disease of the spinal cord. (*Progr. Méd.*, 1879, No. 7).

366. COURVOISIER. Ptosis and Squint following traumatic subdural abscess of the brain ; cured by evacuation of abscess. (*Corresp.-Blatt f. Schweizer Aerzte.*, 1879, No. 1).

367. CRAWFORD, BENTON J. A case of nystagmus of miners. (*Glasg. Med. Journ.*, March, 1879).

368. FALKSON, of Danzig. Paresis of both superior recti and of the left internal rectus muscles in a case of cystochondroma in the third ventricle of the brain. (*Virchow's Arch.*, vol. 75).

369. FRIEDLÄNDER regards the lead-paralysis as a primary myopathic process. (*Virchow's Arch.*, vol. 75, 1, p. 25).

370. GOWERS, of London. On the movements of the lids. He speaks also of the symptoms of impaired motility and of the paresis of the different groups of muscles. (*Lancet*, June 14, 1879).

371. GRAUX. De la paralysie des muscles ocul. externes avec déviation conjuguée. Paralysie centrale par lésion du noyeau de la 6 paire. (*Thése de Paris*, 1879).

372. HIRSCHBERG. A case of ophthalmoplegia universalis oc. sin. traumatica, and of ophthalmoplegia unilateralis motor. et sensit. oc. dextr. (*A. O.*, vol. viii, pag. 353 and 356.)

373. HUTCHINSON. Ophthalmoplegia ext. bilater. Paresis of all the external ocular muscles after luees. (*Lancet*, 1879, No. 7.)

374. NIEDEN. Paresis of the right trochlearis produced by a cystoid degeneration of the pituitary gland underneath the third ventricle. (*C. f. Nervenhlk.*, 1879, No. 8.)

375. RÄHLMANN. On the influence of consciousness on the coördination of the movements of the eye and on squint. The principle of coördinate movements of the eye is not valid when

there is no intention of seeing. The deviation depends upon a continued innervation from the brain centre, which is absent during sleep, and, therefore, squint is not to be found during sleep. (*Z. M.*, Jan., 1879, pag. 1–16.)

376. WILBRAND. The Fv. in congenital nystagmus and in the nystagmus of miners. In the latter it is 10° to 15° narrower. (*Z. M.*, April, 1879, pag. 125.)

LIDS.

377. BULL, C. S. 1. Tarsitis gummosa. 2. Amyloid infiltration of the lid and orbit. (*Trans. Amer. Ophth. Soc.*, 1878, pag. 408.

378. CORRADI, Florenz. Hare-lip and coloboma of the upper lid. (*Lo Speriment.*), 1879, 4, *conf. Wien. Med. Chir. Rundsch.*, 1879, 7.)

379. HIRSCHBERG. Vaccine vesicles on the lids. (*A. O.*, vol. viii, pag. 371.)

380. VINCENTIIS, Palermo. Sull cancro delle palpebr.; it started, 1, from the rete Malpighi; 2, from the modified sweat-glands of the lid-margin; 3, from the epithelium of the palpebral conjunctiva. (*Ann. de Ottalm.*, T. viii, 1879, pag. 65.)

LACHRYMAL APPARATUS.

381. HAASE. Leptothrix buccalis in the lower canaliculus. (*A. f. Augenh.*, vol. viii, 2, pag. 219.)

382. HERZENSTEIN. A case of hypertrophy of the plica semilunaris. (*C. f. A.*, March, 1879, pag. 67.)

383. HIRSCHBERG. Dacryoadenitis simplex bilateralis (mumps). (*A. O.*, vol. viii, pag. 369.)

384. RICHET. Syphilitic tumor of the lachrymal sac. (*Gaz. des Hôp.*, pag. 121, 1879.)

385. SABADINS. Contribution à l'étude pathogénique et au traitement des tumeurs et des fistules du sac lachrym. (*Thèse de Paris*, 1879.)

ORBIT.

386. BITSCH. Spontaneous cure of an aneurism of the ophthalmic artery in the orbit. Exophthalmus, pulsation, and blowing murmur. Cure by extra- and intra-ocular inflammatory processes. (*Z. M.*, Jan., 1879, pag. 16.)

387. CREDÉ. Exostosis of the frontal, nasal and superior maxillary bones with a broad basis; removed by operation. (*B. de G. f. Nat. u. Heilk.* Dresden, 1878, Leipzic, 1879.)

388. FALCH. A case of foreign body in the orbit. Severe injury by a knife. Extraction of almost one-half of the blade. He speaks at the same time of the pathology and the literature of orbital injuries. (*Inaug.-Dissert.*, Greifswald, 1879.)

389. HÄNEL. Echinococcus in the orbit. (*B. d. G. f. Nat. u. Heilk. z.* Dresden, Leipzic, 1879.)

390. HIRSCHBERG. Exophthalmus from retrobulbar suppuration. Spontaneous cure. (*A. O.*, vol. viii, pag. 371.)

391. HIRSCHBERG. Anophthalmus congenitus sinister. (*A. O.*, vol. viii, pag. 371.)

392. KNAPP. A case of inflammation of the retrobulbar cellular tissue in primary acute purulent inflammation of the middle ear and diphtheritis. (*A. O.*, vol. viii, pag. 10–11.)

393. JEAFFERSON. Aneurism of carotid, on the left side, in a woman 45 years of age; spontaneous origin; ptosis, exophthalmus, blowing murmur; after a few days ptosis also on the right side. Ligation of carotid in the beginning cures symptoms on left side; seven days later death after right-sided hemiplegia. No autopsy. (*Lancet*, 1879, 329. *C. f. Chir.*, 1879, No. 26.)

394. NIEDEN. Three cases of retrobulbar, pulsating, vascular tumor. Ligation of the carotid. Recovery. Traumatic origin (bruise) in three men, two on left, one on right side. Exophthalmus, pulsation, blowing murmur. Complete recovery after ligation; in one case neuroparalytic corneal ulcer followed. (*A. O.*, vol. viii, pag. 328.)

395. WILLIAMS. Exostosis eburnea orbitæ. (*Trans. Amer. Med. Assoc.*, 1879, May 6–9.

TUMORS.

396. ADAMS. Sarcoma of the iris and ciliary body in a girl 12 years of age. Enucleation. (*Lancet*, 1879, No. 15.)

397. BRIÈRE. Glioma operated in the fungous stage. Recurred after one month, after another extirpation no recurrence for ten months. A second case was operated in the glaucomatous stage, no recurrence for two to three years. (*A. d'O.*, vol. lxxxi, 1 and 2, 1879.)

398. BRIÈRE. Melano-sarcoma of choroid. Death three months later by general infection of the body (*l. c.*).

399. BULL. Myxo-sarcoma of the orbit. (*N. Y. Med. Record*, 1879, page 259.)

400. DERBY, RICHARD. Tumor of the conjunctiva simulating cyst, with chromo-lithogr. (*Trans. Amer. Ophth. Soc.*, 1878, page 430.)

401. DIXON. Cases of sarcoma of the choroid and retinitis album. (*Trans. Amer. Ophth. Soc.*, 1878, page 432.)

402. FALKSON, of Danzig. 1. Granulation-sarcoma of the bulbar conjunctiva. 2. An intraocular tumor produced by irido-choroiditis with detachment of the retina, analogous to keloid tumors. (*Z. M.*, May 1879, pag. 191 and 193.)

403. GOLDZIEHER. A tumor starting from the internal limiting membrane of the retina. Especially in the posterior portion of the retina wart-like colloid excrescences of the limitans interna, probably the product of a diffuse chronic inflammation. The interior was filled with a meshy tissue similar to lung-tissue. (*Z. M.*, Feb., 1879, pag. 45.)

404. HIRSCHBERG. Sarcoma of choroid. (*A. O.*, vol. viii, page 372.)

405. HIRSCHBERG. Oil cysts of the orbit. (*l. c.*, pag. 373.)

406. HODGES, FRANK. Glioma retinæ. No recurrence after two years. (*Lancet*, 1879, Feb. 8th.)

407. JEAFFERSON. Two cases of glioma retinæ. After two resp., three years no recurrence. (*Lancet*, 1879, No. 8.)

408. LANDSBERG, of Görlitz. Sarcoma of the choroid in children. (*A. O.*, vol. viii, pag. 345.)

409. MANCHÉ, of Malta. Fibroma mucosum of the eye. (*A. di Ott.*, 1879, Fasc. i, pag. 13.)

410. MANZ. Extirpation of an osteoma from the orbit. (*A. O.*, vol. viii, pag. 320).

411. PROUT and BULL. Sarcoma of the tarsus and conjunctiva of the lid, with amyloid infiltration. (*A. O.*, vol. viii, pag. 73.)

412. REMY. Sarcoma of the orbit in a one year old child. (*Rec. d'Ophth.*, March, 1879.)

413. RENDU. Gliosarcoma situé derrière la couche ophth. droite, et empiétant sur le ventr. latéral; sympt. simulant complètement une méningite tuberculeuse. (*Progr. Méd.*, Febr. 6. 1879.)

414. RICHET. A case of melano-sarcoma of the choroid in the right eye; recurrence after the enucleation. (*Rec. d'Ophth.*, Jan., 1879.)

415. SCHIESS, of Basel. Circular atheroma of the outer side of the caruncle. (*Correspondenzhl. der Schweiz. Aerzte*, 1879.)

416. SCHIESS and ROTH, Basle. Metastatic sarcoma of the optic disc and of the adjoining retina. (*A. f. Ophth.*, vol. xxv, 2, pag. 177.)

417. STRAWBRIDGE. Tumor of the optic nerve. Round-and spindle-celled sarcoma, the globe degenerated. (*Trans. Amer. Ophth. Soc.*, 1878.)

418. VOGLER. A case of glioma of the retina. Careful collection of the literature. (*A. O.*, vol. viii, pag. 373.)

419. WILLEMER. Tumors of the optic nerve proper, *i.e.*, those developed within the outer nerve-sheath. He communicates 24 cases found in literature, and adds three further cases of myxo-sarcoma of the optic nerve. (*A. f. Ophth.*, vol. xxv, 1, pag. 161–247; *conf. Bibliogr.*, No. 54.)

420. WOLFE. Removal of sarcoma of the orbit with recovery of sight. (*Med. Times and Gaz.*, from the *C. f. Chir.*, 1879, No. 15.)

PARASITES.

421. HAENEL. Echinococcus in the orbit. (*Conf. Bibliogr.*, No. 389.)

422. HIRSCHBERG. A case of cysticercus cellulosæ, 2 *mm.* long, at the lower orbital margin, in a boy 1½ years old. The author observed them in 0.2 per cent. of all the cases. (*C. f. A.*, June, 1879, pag. 172.)

423. SCHUMANN, A. Cysticercus in the left anterior chamber. (*B. d. G. f. Nat. u. Heilk.*, Dresden, 1878; Lepzic, 1879.)

INJURIES.

424. BARDE. Extraction of a foreign body from the orbit, laceration of the optic nerve. (*Raport de l'Hôp. Ophth. à Genève, Fondation Rothschild*, 1879.)

425. BOWER, ERNEST. Penetrating wound of the orbit. Injury to the internal carotid. Death. (*Brit. Med. Journ.*, April 12, 1879, page 547.)

426. BRIÈRE. Blessure de l'œil avec enkystement du corps étranger dans la rétine. Ophthalmie sympath., 30 mois après. (*Ann. d'Ocul.*, vol. lxxxi, pag. 24.)

427. CARRÉ. A piece of steel remaining in the eye for

nine years; then irritation and enucleation. *Gaz. des Hôp.*, 1879, pag. 125.)

428. CRAS. One-sided blindness in consequence of a contusion behind the eye. (*Gaz. des Hôp.*, 1879, pag. 145.)

429. CRESPI, PIETRO. Delle lesioni violente dell' occhio e sue dipendenze. Istituto Ophth. di Milano. The injuries of the eyes and their annexa, observed at the clinic during four years. (*Ann. di Ott.*, vol. viii, pag. 20.)

430. FALCH. Foreign bodies in the orbit. (*Conf. Bibliogr.*, No. 388.)

431. KEYSER. Foreign bodies (shot) in the orbit, having passed through the eyeball. (*Phil. Med. Times*, March 29, 1879; *C. f. Chir.*, 1879, No. 25.)

432. MÉJASSON, HENRY. Des blessures de la cornée au point de vue du prognostic et du traitement. (*Thèse de Paris*, 1879.)

433. V. OETTINGEN. The indirect lesions of the eye in gunshot wounds of the orbital region. Numerous valuable cases contributed. (*Stuttgart, F. Enke*, 1879, 8°).

434. PAGENSTECHER, H. Laceration of the optic nerve by a blow, with remarks on sympathetic Iridochoroiditis. (*Comp. bibliogr.*, No. 300).

435. TROMPETTER. Injuries of the eye. In workmen the left eye is affected in the majority of cases; of 674 cases at the clinic of Munich 355 times. (*Z. M.*, Febr. 1879, p. 55).

436. VERMYNE. A case of multiple rupture of the sphincter pupillæ without any other lesion of the eye, in consequence of a severe contusion. (*Trans. Amer. Ophth. Soc.*, 1878, p. 425).

437. YVERT. Du traumatisme, des blessures et des corps étrangers du globe de l'oeil. (*Rec. d'Ophth.*, Jan. to June, 1879).

OCULAR AFFECTIONS IN GENERAL DISEASES.

438. BOY, PH. Étude clinique sur l'Oeil dans la Paralysie Générale Progr. (*Thèse de Paris*, 1879, 48 pages).

439. GALEZOWSKY. Sur les Affections Oculaires Glycosuriques. He observed Retinitis, Iritis, Iridochoroiditis, Atrophy of the opt. nerve, Amblyopia without ophthalmoscopic changes, Paralysis of the 3., 4, and 7. pair and neuroparalytic keratitis. (*Rec. d'Ophth.*, Febr., 1879, *Progrès Méd.*, 1879, No. 2).

440. KERIATOWSKY. Affect. oculaires diabétiques. (*Thèse de Paris*, 1879).

441. LEVRIER. Accid. oculaires dans les fièvres intermittentes. (*These de Paris*, 1879).

442. MARKUSY. Panophthalmitis of both eyes from cerebrospinal meningitis in a child 10 months old. Two other endemic cases were observed in the neighborhood. (*C. f. A.*, June, 1879, p. 165).

443. PEUNOFF. Observations on diseases of the visual organ in intermittent fever. Especially iritis was observed. During the pyrexia the pupil could not be dilated with atropine. (*Bullet. der Kaiserl. Kaukas. Ges. Riflis*, 1879).

444. THAON. Affections Oculaires liées à la Menstruation. (*Thèse de Paris*, 1879).

445. TIZON. Étude clinique de l'Atrophie ou Phthisie de l'Oeil. (*Thèse de Paris*, 1879, *et Rec. a'Ophth.*, Jan., 1879, p. 64).

V. LITERATURE.

446. BADAL. Clinique ophthalmologique. (*Paris, Delahaye*, 1879, 208 p).

447. BOUCHARDAT. The light and its effects on the eye. He pleads against illumination with electric light. (*Am. a'Ocul.*, vol. lxxxii., p. 104, ff).

448. CASPER's brief report of the ophthalmic clinic from 1869-1878.

449. DONDERS. Annual report of the Ophthalmic Institute at Utrecht for the year 1879. It contains: 1, DONDERS' report on the examination of railroad employés for color-perception; 2, HORSTMANN on the depth of the anterior chamber; 3, v. HAAFTEN on Astigmatism.

450. EMMERT. Second annual report of the private ophthalmic clinic at Berne, 1879.

451. FÜRTH. Hereditary syphilis. He speaks also of the hereditary affections of the eye. (*Vienna*, 1879).

452. GOWERS, W. R. A Manual and Atlas of medical ophthalmoscopy. (*London, Churchill*, 1879, 328 p., with 16 plates). A very extensive and valuable work.

453. HYRTL. Arabian and Hebrew in anatomy. (*Vienna*, 1879, § xxx, pag. 54–60.) He treats of the nomenclature of the eye.

454. INDEX MEDICUS. A monthly classif. record of the current med. literat. of the world, by Billings and Fletcher. (*New York, Leippoldt*, No. 1–4.)

455. JAVAL. Essay sur la physiologie de la lecture, continued. (*Ann. d' Ocul.*, vol. 83, 3–4, 1879.)

456. JAENIKE. Stereoscopic vision. (*Stuttgart, Enke*, 1879.)

457. KLEIN. Text-book of ophthalmology. (*Vienna*, 1879, *Urban und Schwarzenberg*, 780 pag., 45 wood-cuts.)

458. KNAPP. Ninth annual report of the N. Y. Ophthalmic and Aural Institute, for the year 1878. (*New York*, 1879.)

459. LANDOLT. Clinique des maladies des yeux. (*Paris*, 1879, 30 pages.)

460. LIEBREICH, R. School-life and its influence on sight and figure. 2 lectures. (*London Med. Rec.*, 46, April 15, 1879.)

461. MAIER. Annual report (4 years) of the association-clinic at Carlsruhe, 1879.

462. MAUREL. Test-types for the examination of soldiers and seamen. (*Paris, Baillère et fils*, 1879.)

463. MEYER, E. Handbuch der Augenheilkunde. (*Berlin*, 1879, *H. Peters*, 587 pag. 3d edition.)

464. MOÏTESSIER. Éléments de physique appliqués à la médécine et à la physiologie (optique). (*Paris, G. Masson*, 1879, 600 pages, 177 figures.)

465. NICATI. School-hygiene. (*Mars. Med.*, 1879, pag. 162.)

466. v. OETTINGEN. Report of the clinic of the University at Dorpat, for the years 1868–1879. (*Dorpat*, 1879.)

467. PAGENSTECHER, A. Twenty-fifth annual report of the Ophthalmic Hospital for the Poor, at Wiesbaden, 1879.

468. PFLUEGER. The ophthalmic clinic at Berne, 1878. (*Berne*, 1879, *Dalp.*)

469. POGGENDORFF. The history of physics. ii. (*Leipzic*, 1879, *Barth.*)

470. PANAS ET REMY. Anatomie path. de l'œil. (*Paris*, 1879, *Delahaye*, 101 pages, with fig.)

471. SCELLINGO MARIANO. Ambulat. clinico oculistico. Rapporto statist. per l' anno 1878 e note cliniche sulle malattie della conjunctiva, 1879.

472. SCHÖLER. Annual report of his clinic. (*Berlin*, 1879, *Peters*, 71 pages.)

473. SICHEL. Traité éléments d' ophth. i. (*Paris*, 1879, *C. Masson.*)

474. SOUS, G. Traité optique de l' œil. (*Paris*, 1879.)

475. DE WECKER. Chirurgie oculaire. (*Paris*, 1879, *Doin*, 418 pages.)

NOTICES.

The lithographic plates illustrating some of the papers in these ARCHIVES are mostly made in Germany. For each number of the English edition such plates are selected as best suit the arrangement of the material on hand. The numbers of the plates added to each issue of the journal will, therefore, not always be in regular order, but they will be indicated under the titles of the papers to which they belong.

In Plate 1, added to this nnmber, the two last figures are superfluous, being a repetition of the wood-cuts found in the text of an article by Dr. Hotz, which was published in vol, viii, of the English edition.

THE SIXTH INTERNATIONAL OPHTHALMOLOGICAL CONGRESS will be held at Milan, Italy, from the 1st to the 4th September of this year.

Committee of Arrangements at Milan.

Prof. QUAGLINO, *President*,
Dr. PIERD'HOUY, *Secretary*.

THE SECOND INTERNATIONAL OTOLOGICAL CONGRESS will be held likewise at Milan, from the 6th to the 9th September.

Committee of Arrangements.

Prof. VOLTOLINI, of Breslau, (Prussia), *President*,
Prof. MOOS, of Heidelberg, (Germany), *Secretary*.